

Municipal Journal

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No. 25

ELECTRIC VEHICLES FOR CENTRAL STATION SERVICE*

Advantages of Electric Truck for this Work—About Fourteen Hundred Now Used by Central Stations—
Performance, Fleet Make-Up and Costs for Some of the Larger Stations

By ARTHUR WILLIAMS.†

In maintaining an organization to supply light, heat and power to a community or a city, transportation requirements are innumerable. Supplies of all sorts must be delivered and distributed, under or over-ground lines extended, lamp posts set, arc lights trimmed, construction superintended and blow-outs or other trouble cared for. A great proportion of this work—practically all of it, in fact—lies within the district served by the central station, and trucking incidental to such a territory requires, in few instances, trips of more than 35 or 40 miles a day. This work is peculiarly suited to the electric vehicle, since the mileage is well within its power; and in its field, the electric has shown itself to be a most economical and efficient machine. There are also other benefits peculiar to its use by the central station—the transportation department is placed on a most effective basis and, by promoting its use, the income is increased. It is an advertisement on wheels.

These facts have been recognized and during the past few years the larger central stations have adopted the electric for nearly all branches of their work. The first few cars, purchased partly as an experiment, proved so successful that larger orders followed. Ten of the

larger companies alone are now using 650 cars. These are as follows:

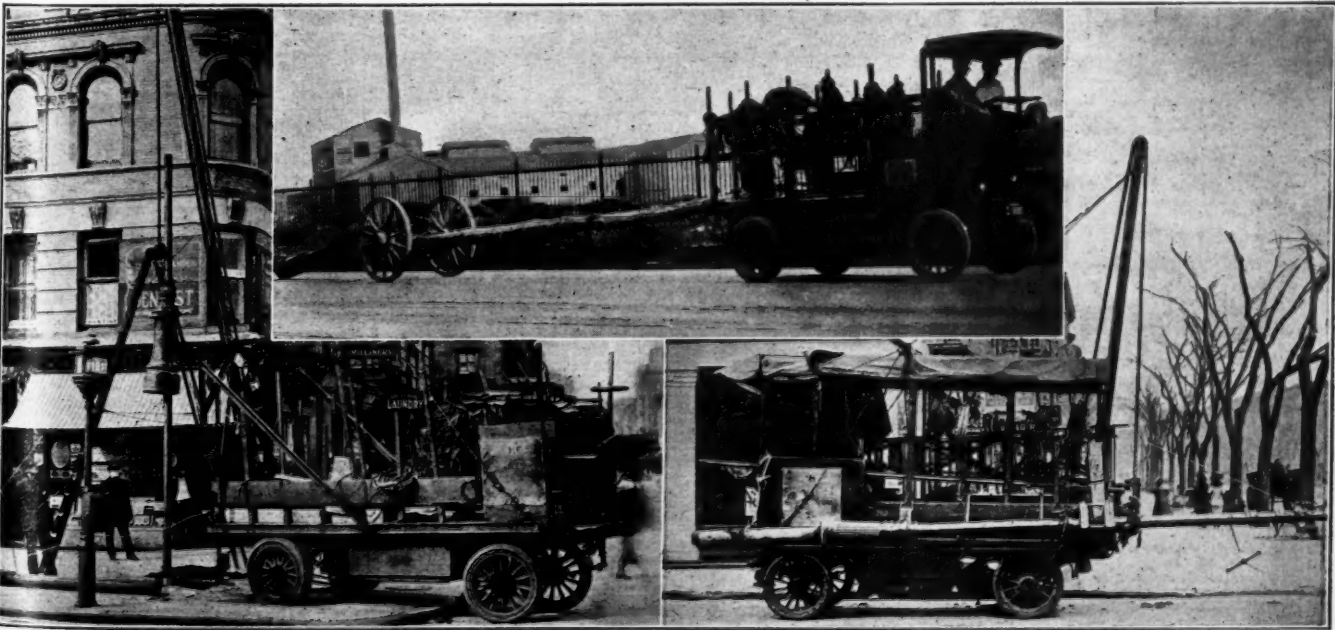
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Total 650

Let us consider the practices of the larger central stations and the branches of work that are being handled so successfully by electric vehicles.

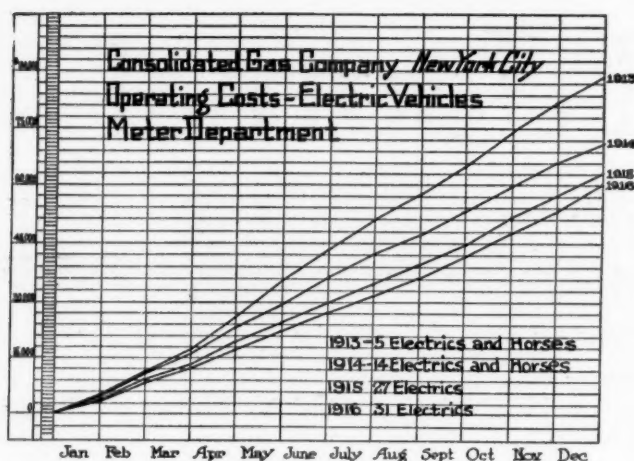
The New York Edison Company—This company has been a consistent user of electrics for many years. In 1903, 12 cars were put into service and this installation was so successful that more cars, both passenger and commercial, were added. The present fleet of 137 includes the 12 veterans with 14 years of constant service to their credit. Two of the 1-ton cars of the 1903 fleet have an especially fine record and have lost hardly a day during their period of service.

*Abstract of paper presented at the Convention of the National Electric Light Association.
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ELECTRIC TRUCKS USED BY LIGHTING COMPANIES.

At the left, three-ton truck of New York Edison Co. equipped with boom, setting lamp post. At the top, New York and Queens Co.'s electric using a trailer for hauling a pole. At the right, Edison pole-setting truck carrying lamp post to be set.



All the cars are under the supervision of the transportation department and are charged to the various departments at so much per hour, the rate depending on the trucks. The main garage of the company houses about three-fourths of the total fleet. Distribution of types of trucks to the various departments are as follows:

To the distribution department are assigned ten 5-ton trucks, which are used for pulling cable, overhead work, and also for transporting cables and other heavy material. All of these cars are equipped with electric winches. Five 2-ton trucks are used exclusively for carrying materials for service work in the streets, at junction boxes and in making connections at houses. Six 1½-ton cars are employed in transporting meters. These cars have specially built bodies with bins for the meters, and padded with mats to prevent injury from jarring. There are also two 1-ton emergency wagons, which are always kept loaded with material for emergency underground repairs. One 3-ton and two 3½-ton trucks are used for overhead line work and have booms for setting poles. Twenty 1-ton trucks are used in addition for delivering material for work in progress on the streets. One car of this size acts as an emergency wagon for the Bronx.

A fleet of 39 lamp wagons is assigned to the store-room department. As the name implies, the work of these cars is to deliver incandescent lamps to customers.

This department also has one 1-ton car used exclusively for delivering stationery and another car of the same type for carrying materials between all the storerooms and stations of the company.

The meter test and arc department should really be considered under three separate divisions—meter and meter test work, arc light, and testing of machinery and materials. In the arc department work there are four 1-ton wagons equipped with electrically operated elevating towers for the inspection and repair of arc lights. Two of these cars make their rounds in daytime and two at night, thus acting to a large extent as emergency wagons. Two 1-ton cars deliver supplies and do other general work, such as bringing material for the pole setting truck, which is a 3-ton car with a boom for setting arc light posts in the streets. A 2½-ton truck (of the 1903 fleet) is used for hanging commercial signs. A 1-ton wagon is used for laboratory work by the test department, while the meter department uses a similar car for transporting meters to be tested and for general hauling.

The inspection department has a 700-pound wagon which delivers electric irons and other heating apparatus, leaving them on trial and collecting those not purchased.

Four cars are regularly assigned for general work for the transportation department—a 700-pound wagon, a 1-ton, a 2-ton and a 5-ton truck. Cars ordinarily used by other departments are assigned to this department when not needed elsewhere. In addition to this fleet of trucks, there are thirteen superintendents' wagons, used principally in supervising jobs.

The passenger car equipment is composed of 23 cars. These vehicles are invaluable for the officers of the company and are used in their numerous trips about the city.

The work being confined to Manhattan and the Bronx, it is natural that the mileage requirements of all the cars should be very small. The average mileage for passenger cars for one year of 303 working days was 19.8 miles per day. The mileage for the trucks and delivery wagons was also small. For the 700-pound wagons it was 13.9 miles; for the lamp wagons, 15.8 miles; for the 1-ton trucks, 21.5 miles; for the 1½-ton truck, 20.8 miles; for the 2½-ton, 3-ton and 3½-ton cars, 12.9 miles and for the 5-ton trucks, 12.5 miles.

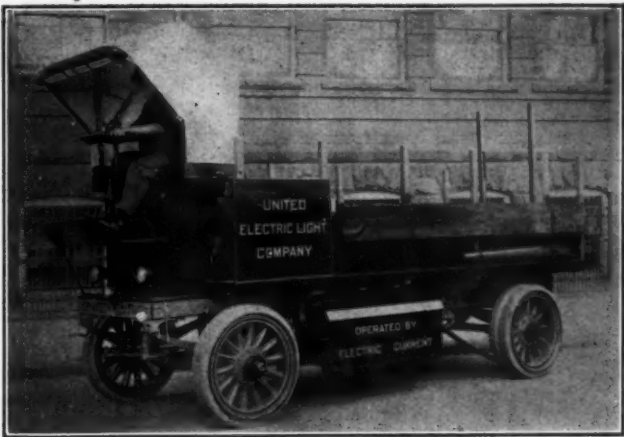
1	GENERAL INFORMATION											
2	RATED CARRYING CAPACITY OF VEHICLE IN POUNDS		700	700	750	750	1000	1000	1000	1000	1000	1000
3	MANUFACTURER OF VEHICLE		GEN. VEH. Co.	GEN. VEH. Co.	HARDY VEH. Co.	HARDY VEH. Co.	GEN. VEH. Co.	GEN. VEH. Co.	GEN. VEH. Co.	GEN. VEH. Co.	GEN. VEH. Co.	GEN. VEH. Co.
4	DEPARTMENT OF COMPANY USING VEHICLE		STORE ROOM	STORE ROOM	APPLIANCE	APPLIANCE	LAMP	LAMP	LAMP	STORE ROOM	LAMP	INSTALLATION
5	COMPANY'S VEHICLE NUMBER		14	15	30	31	2	3	8	9	22	23
6	REPORT COVERS PERIOD		FROM	JUNE 15 '1911	JUNE 15 '1911	JUNE 25 '1911	JUNE 1 '1911	JAN. 1 '1911	JAN. 1 '1911	JAN. 1 '1911	FEB. 28 '1911	MAR. 4 '1911
7			TO	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911	JUNE 30 '1911
8	DAYS IN PERIOD COVERED BY REPORT		1841	1840	401	30	2008	2008	2008	2008	1218	1218
9	AGE OF VEHICLE IN DAYS		1841	1840	432	33	2613	2497	2063	2063	1218	1212
10	PERFORMANCE PER VEHICLE											
11	WORK DAYS IN PERIOD		1554	1548	362	26	1698	1691	1697	1703	1030	1152
12	DAYS OPERATED DURING PERIOD		1479	1468	348	26	1614	1646	1649	1616	996	1120
13	WORKING DAYS OUT OF COMMISSION		75	80	14	0	84	45	48	87	34	32
14	WORKING DAYS OUT OF COMMISSION IN PER CENT OF WORK DAYS IN PERIOD		4.82	5.16	3.86	0	4.95	2.67	2.83	5.10	3.30	2.78
15	MILES TRAVELLED DURING PERIOD		26684	30137	7564	714	22251	17681	26778	33106	15523	26251
16	AVERAGE MILES TRAVELLED PER DAY		18.0	20.3	21.7	27.5	13.8	10.7	16.2	20.5	15.6	23.4
17	EXPENSE PER VEHICLE											
18	AVERAGE DAILY OPERATING COST IN DOLLARS		3.61	5.37	6.17	4.60	6.45	5.77	5.94	6.46	6.23	6.28
19	AVERAGE OPERATING COST PER MILE IN "		.312	.262	.284	.168	.468	.528	.366	.316	.400	.314
20	AVERAGE YEARLY OPERATING COST IN "		1648.00	1565.00	1950.00	1463.00	1892.00	1695.00	1778.00	1900.00	1863.00	2115.00
21	AVERAGE OPERATING COST PER ANNUM IF OPERATED 312 DAYS IN DOLLARS		1754.00	1676.00	1902.00	1436.00	1999.00	1770.00	1852.00	2005.00	1948.00	2045.00

REPORT OF OPERATION OF ELECTRIC VEHICLES

No special make of car is used. The New York Edison Company has representatives of nearly every variety. In addition to the cars purchased complete from the manufacturers, a few cars have been assembled by the company's workmen. Repairs, rebuilding and assembling are all done at the main garage.

United Electric Light & Power Company, of New York City.—The 29 electric vehicles in the service of this company have been very satisfactory. The equipment and nature of service are shown below:

No. of Vehicles.	Rated Cap. in Pounds.	Dept. of Co. Used by.	Nature of Service.
1	700	Storeroom	Delivering lamps.
1	700	Storeroom	Delivering appliances.
2	750	Appliance	Delivering appliances.
4	1,000	Appliance	Delivering lamps.
1	1,000	Appliance	Transporting light, miscellaneous material.
1	1,000	Installation	Inspection and emergency
1	1,000	Installation	Trimming and repairing arc lamps.
5	2,000	Undergr'nd	Inspection and emergency
1	2,000	Undergr'nd	Transporting cable, splices and material.
1	2,000	Installation	Inspection and emergency.
1	2,000	Installation	Trimming and repairing arc lamps.
1	2,000	Storeroom	Delivering lamps and meters.
1	2,000	Storeroom	Delivering meters.
1	2,000	Storeroom	Meter and service work.
1	4,000	Undergr'nd	Trucking and pulling cable.
1	4,000	Storeroom	Transporting heavy miscellaneous material.
1	7,000	Undergr'nd	Trucking and pulling cable.
1	7,000	Undergr'nd	Transporting cable splicers and material.
3	10,000	Undergr'nd	Trucking and pulling cable.



THREE AND A HALF TON TRUCK WITH WINCH. Used by United Electric Light Co. of Springfield, Mass.

Consolidated Gas Company, New York.—The present fleet of electrics of the Consolidated Gas Company consists of 38 vehicles. Thirty-four of these are assigned to the Meter Department and are used for delivering meters, gas ranges, heaters and other appliances. Three are 750-pound wagons, two 1,000-pound and twenty-nine are one-ton trucks. The remaining cars are a one-ton emergency wagon used by the Street Department and three runabouts.

This particular installation of electrics has demonstrated most strikingly the great economy and increased efficiency of this type of vehicle as compared to horses. In the Meter Department, which handles practically all transportation work, five electrics were used in 1913, the rest of the work being done by horse-drawn wagons. The cost of haulage done by this equipment during that year was approximately \$88,000. This did not include the cost for extra hauling done by contractors during specially busy seasons, but merely that done by the company's own vehicles. The following year nine more electrics were added and fewer horses used. More work was handled and yet the cost was decreased by some \$17,000. In 1915, thirteen additional electrics were purchased, which made the fleet capable of caring for a very large percentage of the work. The cost dropped to \$63,000.

Finally four more trucks were put in service in

The annual report of this company on the operation of its electric vehicles is interesting in view of the fact that the daily cost of operation per vehicle is very nearly the same as that worked out by the Electric Vehicle Association a few years ago. Combining the 700 and 750-pound vehicles in one class, the daily average cost, including drivers, was \$5.43, compared with the E. V. A. estimate of \$5.51. Actual cost and estimate for the other cars are as follows: 1,000-pound, \$6.23 and \$6.20; 2,000-pound, \$6.86 and \$7.45; 4,000-pound, \$8.10 and \$9.07; 7,000-pound, \$9.39 and \$11.04; 10,000-pound, \$10.18 and \$12.25.

2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	4000	4000	7000	7000	10000	10000	10000
GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	WARD VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	WARD VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.	GEN VEH Co.
Underground	Underground	Installation	Installation	Store Room	Underground	Store Room	Underground	Underground	Underground	Store Room	Underground	Store Room	Underground	Underground	Underground	Underground	Underground	Underground
6	7	13	25	27	28	17	18	19	20	21	10	11	26	5	12	16	29	
JAN 1 1911	JAN 1 1911	DEC 31 1910	JULY 7 1913	JAN 20 1913	JAN 20 1913	JAN 25 1912	JAN 25 1912	JAN 31 1912	JAN 30 1912	JAN 6 1912	NOV 30 1910	DEC 25 1910	APR 1 1913	JAN 1 1911	DEC 23 1910	JAN 31 1911	MAY 30 1912	
JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910	JUNE 30 1910
2008	2008	2005	1089	1196	771	1556	1612	1610	1611	1575	2036	2013	1105	2008	2013	1610	761	
2083	2076	2005	1218	1196	771	1556	1612	1610	1611	1575	2036	2013	1105	2095	2013	1610	761	
1936	1955	1804	985	1017	644	1336	1474	1464	1493	1337	1739	1708	1007	1703	1701	1367	640	
1082	1949	1751	959	980	636	1272	1462	1429	1456	1299	1695	1681	971	1678	1657	1338	623	
54	6	33	26	37	8	64	12	35	37	38	44	27	36	25	44	29	17	
2.79	0.31	2.94	2.64	3.64	1.24	4.79	0.81	2.38	2.48	2.05	2.53	1.58	3.58	1.47	2.58	2.12	2.66	
22582	20700	30654	17829	23845	9092	28233	17497	20447	20549	27074	17305	29950	12545	16618	16127	13121	5955	
12.0	10.6	12.5	10.6	244	14.3	22.2	11.95	14.3	14.1	20.8	10.3	17.8	12.9	9.90	9.74	9.80	9.55	
6.55	6.14	7.25	7.44	6.85	6.26	8.00	6.42	6.49	6.48	7.58	8.17	8.04	9.48	9.31	10.67	9.69	10.18	
.546	.577	.415	.400	.281	.439	.360	.537	.453	.460	.364	.797	.451	.734	.940	1.095	.987	1.002	
2240.00	2170.00	2315.00	2395.00	2030.00	1887.00	2390.00	2125.00	2105.00	2140.00	2280.00	2485.00	2455.00	2840.00	2838.00	3205.00	2930.00	3043.00	
2142.00	2047.00	2311.00	2381.00	2140.00	1957.00	2494.00	2082.00	2090.00	2097.00	2368.00	2535.00	2500.00	2942.00	2888.00	3282.00	3008.00	3142.00	

December 1915, bringing the total up to thirty-one for this department, again lowering the cost of transportation, this time by some \$3,000. The last three cars purchased in December 1916 are not included in the above estimate of costs.

This saving of nearly \$30,000 is due primarily to the fact that the electrics were capable of doing double the work of the horse-drawn vehicles. Each car replaced two double trucks which had been charged to the department at \$14 a day. The electric cost \$7.00 per day and made it possible to send two crews out at one time instead of one, owing to the increased speed and carrying capacity. A fitter and helper could be left at a job, and the car sent on to another place with the second crew, coming back later to get the first men. Also, on large work such as hotels and industrial installations, the crews could be doubled. Such efficiency was of course impossible with horse-drawn vehicles.

While operating costs vary greatly with different conditions, the total cost of operating the 35 electrics in 1916 in the Gas Company fleet is of interest. Including chauffeurs' wages, the average operating cost per car, irrespective of size, was \$1,916.97. This figure, however, may be considered as the cost of a 2000-lb. car, owing to the fact that 80% of the fleet are this capacity.

A more detailed report is given below:

Cost of Operating Thirty-eight Electrics in 1916.	
Chauffeurs	\$26,068.30
Electric current.....	8,225.71
Battery repairs.....	11,219.54
Tires	2,499.90
Lubricants	39.46
Supplies	209.59
Washing and cleaning.....	3,073.23
Small repairs.....	4,619.87
Overhauling	2,607.84
Painting	1,637.94
General garage expense.....	6,892.90
Total cost.....	\$67,094.28
Mileage	202,698
Cost per mile per car.....	\$0.331

Commonwealth Edison Company, Chicago.—This company operates the largest fleet, 150 cars, maintained by any central station. These are assigned to various departments and handle a variety of work as follows:

	Cars
Stores department (delivering merchandise).....	19
Transportation department.....	13
Customers, service and repair department (appliance repairs, lamp installation and service, meter setting, etc.)	38
Emergency	10
Street department (trip work, cable pulling and line work)	38
Outside company (coal hauling).....	1
Electric shop (merchandise).....	4
Engineering department (trip work and passenger)..	1
Lamp department.....	18
Bureau of cooperation with merchants.....	1
Construction department (sign division).....	7
Total	150

Philadelphia Electric Company.—Forty-seven electrics are in the service of this company. Of the twenty-one of the one thousand-pound type, seven are used as power wagons for arc lamp trimming, four for delivering incandescent lamps, one is assigned to the electric shop, seven to the meter department and one each to the underground and complaint departments. Eight 1-ton machines are used to maintain overhead lines, two are employed by the arc lamp department and the other two by the meter and underground department. Freight is hauled on seven 2-ton trucks, which are also used on overhead line work. A 3½-ton car is assigned to the

underground department and two 6-ton trucks are used as pole wagons.

Edison Electric Illuminating Company of Boston.—Twenty-three of the 82 electrics operated by this company are of the passenger type. These are used by inspectors, arc light patrols, foremen and for general work. In the commercial class there are fourteen 700-pound vehicles for installing service, arc repairs and general work. Of the twenty-three 1,000-pound cars, eleven are used for installing service, four for lamp renewals, three for arc repairs, one emergency and three for general work. One ¾-ton and one ½-ton take care of overhead repairs. Two of the seven 1-ton cars are equipped with electrically operated pumps for cleaning manholes, one handles lamp renewals, one is used for emergency and the others for general work. Four 2-ton trucks are



FOR ARC LIGHT REPAIRING.
Two-thousand-pound electric with electrically operated tower.
New York Edison Co.

used for overhead repairs, two for underground work and three act as spare wagons. A 3½-ton truck carries cables and supplies for underground work and a 5-ton machine is assigned to freighting work.

New Orleans Railway & Light Company.—The 18 electrics in the service of this company are called upon for a much larger mileage than is usually required for central station work. In some cases the average for 2-ton trucks has been 40 miles a day, and the fact that they have performed well under this work shows that they will be of service for central station work in smaller towns where there are long trips between jobs. Five

2-ton and one 3½-ton trucks, which average about 12 miles a day, are used on construction; the underground cable gang has a 2-ton truck averaging 25 miles a day; in truck construction and maintenance work there are four 2-ton trucks which are called upon for forty miles daily; electric service wagons, five in number, make 35 miles a day and a 1,000-pound trouble wagon has a similar mileage.

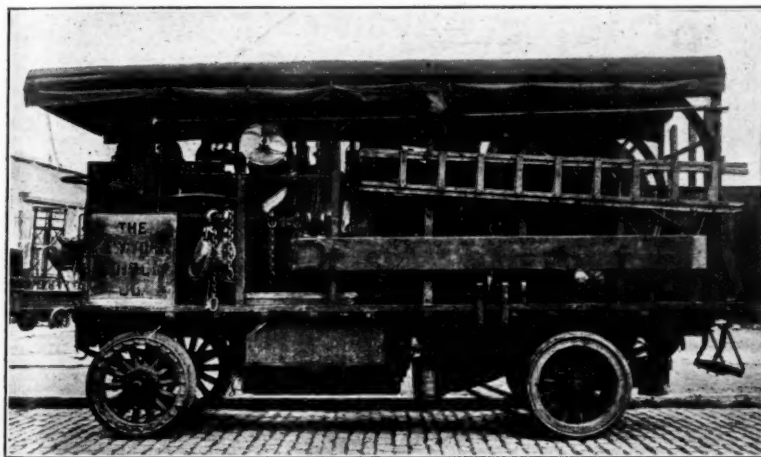
Duquesne Light Company of Pittsburgh.—Twenty-eight electric commercial cars, and one electric passenger car used for inspecting and testing work, are in use by this company. The trucks are used for hauling and on service connection work. Three of the cars deserve special mention. One of the 5-ton electrics is used for removing ashes from one of the power plants. This car has performed satisfactorily over very poor roads. There are also two trucks, a 2-ton and a 5-ton, equipped with winches for cable pulling. The 5-ton is a special machine with a front-wheel drive and a low floor body so that two reels of cable can be easily loaded.

Rochester Railway & Light Company, Rochester, N. Y.—Practically all of the transportation work of this company is handled by electrics. The only place where gasoline cars have been found better adapted is for trips to neighboring towns and for patrolling circuits at night. In this last case, the streets are clear of traffic and the gas cars can make faster time. Since the first electric was bought in 1909, the fleet has been increased to 63 cars.

The United Electric Light Company of Springfield, Mass.—Electric vehicles are used in nearly every branch of work and have been in service for five years. Two 5-ton and one 3½-ton trucks are equipped with winches and assigned to underground construction work with average trips of 15 miles. On cable work and transformer installations, two trucks, a 1-ton and a 2-ton, cover twenty miles a day. Three 2-ton trucks handle overhead construction. The three meter department cars, one 1-ton and two ½-ton, have a daily mileage of thirty miles. Five 1,000-pound cars are employed in trimming and patrolling street lights and make about 35 miles a day. The generating department uses a 1-ton truck and the collection department a roadster.

New York and Queens Electric Light & Power Company.—The fleet consists of 29 cars, ranging in size from runabouts to 5-ton trucks. The runabouts are used for contract agents, while the trucks are employed on service and line work.

Almost every variety of transportation work is handled by the electrics in one or another of these companies. Possibly all the work of this or that organization is not within the field of the electric, but that should not prevent their being used in branches adapted to them. Each year companies using them are purchasing more cars. This would not be done if the electrics in service had not proved practical. They are employed because it pays to use them.



CABLE-PULLING TRUCK LOADED WITH SUPPLIES READY TO START ON A JOB.



NEW YORK EDISON FIVE-TON TRUCK PULLING A CABLE.

INFORMATION CONCERNING ELECTRIC LIGHTING

Reports From More Than Two Hundred Cities—Descriptions of Station and Street Lines Equipment—Amount of Current Generated or Bought—Connected Load Statistics—Operating Expenses.

The information given in the four tables on the following pages was furnished at our request by the superintendents or other officials of the lighting plants, to whose cooperation we and those who find the information of service are greatly indebted. As all sections of the country and all sizes of cities are represented, the tables give a bird's eye view of the conditions as to plant and business in the United States, including the progress in the adoption of modern machinery and types of lamps.

As to the latter, it is interesting to note that less than one per cent of all the lamps in use are arcs, incandescents having replaced most of these in both street lighting and commercial service. In fact, the total num-

ber of arcs used in commercial service is only about .02 of one per cent of commercial lamps; while for street lighting arc lamps constitute only about 15 per cent of the whole.

Another interesting feature is the almost universal practice by municipal plants of furnishing commercial service. A few years ago many of the municipal plants were required by law to confine themselves to lighting streets and public buildings; but last year 93 per cent of the lamps for which current was furnished by such plants were privately owned and only 7 per cent were for street lighting. Other commercial services also are being developed by municipal plants, such as cooking and

(Continued on page 824.)

TABLE NO. I.—STATION AND STREET LINES EQUIPMENT.

City and State	Source of Current	Boilers—			Engines—			Generators—			Other Sources of Power	Length of Wire Poles in Else-where Streets	Length of Streets With Overhead Wire Miles	Length of Streets With Conduits	Length of Buried Cable
		No.	h. p.	Make	No.	h. p.	Make	No.	k. w.	Make		or feet			
Alabama:															
Alexander	purchased	2	300	Weldman & Walsh	2	400	Hardie, Tynes & Chandler; Taylor	2	290	Gen. Elec.	none	380	1	none	none
Cullman	generated	2	250	Lombard	2	250	Harrisburg	2	175	Gen. Elec.	none	500	12	none	none
Arizona:															
Glendale	purchased	2	250	Lombard	2	250	Harrisburg	2	175	Gen. Elec.	none	500	12	none	none
Arkansas:															
Hope	generated	2	300	Casey & Hedges	2	650	Bates, Filler & Stowell	2	500	Westg. Bullock	none	500	12	none	none
Little Rock	generated	1	350	Stirling	1	800	Curtis	1	500	Gen. Elec.	none	500	12	none	none
Pine Bluff	generated	6	1,800	B. & W.	3	2,375	Curtis	3	2,275	Gen. Elec.	none	500	12	none	none
California:															
Alameda	generated	6	1,350	Heine & Stirling	4	1,525	kw. Parsons & Fleming	2	200	Gen. Elec.	U. S. Recl. Serv.	380	1	none	none
Glendale	generated	2	300	Casey & Hedges	2	650	Bates, Filler & Stowell	2	500	Westg. Bullock	none	500	12	none	none
Riverside	generated	1	350	Stirling	1	800	Curtis	1	500	Gen. Elec.	none	500	12	none	none
Connecticut:															
Danbury	generated	3	450	Stirling	2	700	Nordberg	2	200	Gen. Elec.	Power Co.s.	500	12	none	none
Norwalk	generated	4	1,280	Heine	2	300	G.E. Turbines	4	1,800	Gen. Elec.	120 k. w. water power	500	12	none	none
Wallingford	generated	5	500	Watertown	8	1,330	Buckeye Watertown & Am. Diesel	3	885	Gen. Elec.	120 k. w. water power	500	12	none	none
Delaware:															
Lewes	generated	2	160	Keeler	2	140	Watertown	2	190	Westinghouse	120 k. w. water power	500	12	none	none
Florida:															
Jacksonville	generated	10	5,090	Babcock & Wilcox	2	3,000	Allis; Curtis Skinner & Erie Ball	3	500	Ft. Wayne, Stanley & Bullock	none	500	12	none	none
Tallahassee	generated	3	550	Schofield	3	600	Watertown	2	190	Westinghouse	120 k. w. water power	500	12	none	none
Georgia:															
Acworth	purchased	4	800	Cole & Schofield	4	1,400	Skinner, Murray, Harrisburg	4	987	Ft. Wayne	water power	500	12	none	none
Dublin	generated	2	120	Ames	1	85	Fleming	1	60	Ft. Wayne	none	500	12	none	none
Jackson	purchased	2	450	Schofield	3	750	Ball	3	500	G. E. & West.	none	500	12	none	none
Meigs	generated	2	450	Schofield	3	750	Ball	3	500	G. E. & West.	none	500	12	none	none
Monticello	generated	2	450	Schofield	3	750	Ball	3	500	G. E. & West.	none	500	12	none	none
Newman	purchased	2	450	Schofield	3	750	Ball	3	500	G. E. & West.	none	500	12	none	none
Social Circle	purchased	2	450	Schofield	3	750	Ball	3	500	G. E. & West.	none	500	12	none	none
West Point	both	2	300	Lombard	1	300	Green	1	300	Green	purchased	500	12	none	none
Idaho:															
Weiser	purchased	2	300	Lombard	1	300	Green	1	300	Green	purchased	500	12	none	none
Illinois:															
Altamont	generated	2	200	Brownell	2	175	Ideal & Brownell	2	175	Elec. Mach.	none	500	12	none	none
Belleville	purchased	5	1,208	Stirling	2	3,000	Westinghouse & Allis-Chalmers	2	1,600	Allis-Chalmers	none	500	12	none	none
Bloomington	generated	10	400	Stirling	8	3,300	St. Louis & Allis-Chalmers	2	1,600	Allis-Chalmers	none	500	12	none	none
Carlyle	generated	3	380	Wangler	2	350	Chuse & Ham.	2	262	Minneapolis	water works	500	12	none	none
Columbia	generated	2	200	O'Brien & Bass	1	60	Ideal	1	70	Allis-Chalmers	none	500	12	none	none
Galesburg	purchased	4	1,000	Erle & Frost	2	500	Lentz & Allis	2	400	Wood	none	500	12	none	none
Highland	generated	2	300	Brownell	2	450	Chuse & Ham.	2	300	Gen. Elec.	none	500	12	none	none
Metropolis	generated	4	600	Spring, Atlas C. & H.	3	785	Chuse, Ideal, L. & B.	3	550	G. E. & Westg.	none	500	12	none	none
St. Charles	generated	3	750	Erle, Lyons	2	350	Ball	2	250	Gen. Elec.	none	500	12	none	none
Stonington	generated	2	120	Indianapolis	1	150	Chuse	2	45	Triumph	none	500	12	none	none
Indiana:															
Bluffton	generated	3	1,050	Stirling	2	1,700	Reeves & Ham, Corliss	2	600	Gen. Elec.	none	500	12	none	none
Bremen	purchased	3	1,050	Stirling	2	1,500	Gen. Elec.	2	1,000	Gen. Elec.	none	500	12	none	none
Crawfordsville	generated	4	1,300	Stirling	2	1,500	Westinghouse	2	500	Westinghouse	none	500	12	none	none
Frankfort	generated	2	500	Stirling	3	1,000	Alfred, Buckeye & Skinner	3	770	Westinghouse	none	500	12	none	none
Greenfield	generated	3	450	Standard	2	675	Allis-Chalmers	2	450	Gen. Elec.	none	500	12	none	none
Kendallville	generated	3	450	Standard	2	675	Allis-Chalmers	2	450	Gen. Elec.	none	500	12	none	none

Mishawaka	purchased	3	1,600	Scotch	2	1,000	Ham-Corliss	1 ²	200	Ft. Wayne	..	2,328	..	..	5,000
Peru	generated	6	2,250	Marine	2	1,900	Ham-Corliss	2 ¹	700	Ft. Wayne	..	852	..	all	none
Richmond	generated	6	660	Stirling	2	1,900	Ham-Corliss	2 ¹	300	Gen. Elec.	..	12	..	..	3,400
Rushville	generated	2	350	Boys	2	215	Ham-Corliss	2	155	Ft. Wayne	..	85	..	..	..
So. Whitley	generated	2	350	Boys	2	215	Ball, H. S. & G.	2	155	Westinghouse & Seamans-Halske	..	..	..	..	..
Iowa:															
Ackley .....	.....	3	320	Atlas	2	175	Filler & Stow-	3	125	Westinghouse;	..	250	..	..	..
Ames	generated	3	550	Kewanee	2	300	ell; Ideal	3	700	Ft. Wayne	..	..	..	..	..
Atlantic	generated	5	525	Murray	2	750	Ham. & Ideal	3	500	Westinghouse	..	..	..	24	..
Cedar Falls	generated	4	200	Kewanee	2	230	Murray	2	110	Ft. Wayne	..	..	..	..	..
Eddyville	generated	2	230	Frost	2	285	Bates Corliss;	2	175	Gen. Elec.	..	..	..	..	..
Greenfield	generated	2	250	Murray;	2	500	Murray-Corl.	2	325	G. E.	..	6	..	33,060	600
Harlan	generated	3	300	Murray;	1	125	Murray	2	350	Westinghouse	..	..	..	..	..
Mt. Pleasant	generated	3	450	Murray	2	750	Ideal	1	75	Westinghouse	..	..	..	..	5,772
Washington	generated	3	450	Murray	2	750	Murray	2	500	Westinghouse	..	..	..	..	none
Webster City	generated	3	450	Murray	2	750	Murray	2	500	Westinghouse	..	..	..	..	1 1/2
Kansas:															
Baldwin City	generated	2	300	Atlas	3 ¹	235	Weber; Olds	..	..	..	..	4	..	all	..
Beloit	generated	6	1,263	Kewanee	2	375	Ham-Corliss	2	270	Westinghouse	..	..	..	..	1,100
Coffeyville	generated	3	750	Heine	2	850	Westinghouse	4	1,840	Westinghouse	..	..	..	..	..
Ft. Scott	generated	3	650	Freeman	2	1,250	Kerr; Ham.	2	1,000	Gen. Elec.	..	..	..	..	..
Girard	generated	2	300	Erle	2	600	Alis; Quincy	2	400	Westinghouse	..	..	..	..	..
Hiawatha	generated	2	220	Kewanee	2	275	Murray Corliss	1 ²	75	Gen. Elec.	..	..	..	8	..
Horton	generated	2	300	Erle	2	275	Alis; Bick-	2	440	Bullock & Alis-Chalmers	..	..	..	4	3,500
Lincoln Center	generated	2	220	Kewanee	2	275	Ideal & Skin.	2	125	Westinghouse	..	..	..	..	..
Lindsborg	generated	2	300	Kewanee	2	275	Hamilton;	2	225	Westinghouse	..	..	..	11,000	..
Neodesha	generated	4	500	Erle;	2	55	Nordberg	2	400	Gen. Elec.	..	..	..	..	3,000
Ottawa	generated	4	110	Brownell	3	305	Strait	2	400	Gen. Elec.	..	..	..	..	..
Topeka	generated	3	450	Bromich	1	550	Russell;	4	625	Westinghouse	..	..	..	..	13,000
Topeka	generated	3	450	Bromich	1	550	Bates; Otto	1	500	Westinghouse	..	..	..	8	..
Kentucky:															
Morehead	generated	1	125	Stanwood-	1	90	Murray-Corl.	1	75	Gen. Elec.	..	..	..	..	..
Louisiana:															
Natchitoches	generated	2	100	Wand	2	300	Ham-Corliss	1	75	Gen. Elec.	..	..	..	2	..
New Iberia	generated	4	500	Brownell	2	300	Harrisburg;	2	200	Crocker-Wheel-	..	..	..	..	..
Ruston	generated	3	300	B & W,	3	400	Harrisburg;	3	375	Ft. Wayne	..	..	..	..	..
H. S. & G.	generated	3	300	H. S. & G.	3	539	Corliss	3	375	Ft. Wayne	..	..	..	..	..
Massachusetts:															
Chicopee	both	4	968	Dillon	3	2,025	Gen. Elec.	..	..	..	..	..	..	..	..
Easthampton	both	4	1,900	Heine	2	4,100	Westinghouse	..	..	..	..	..	..	..	..
Greenfield	both	4	2,070	Porcupine;	2	4,100	..	..	..	..	..	..	..	..	..
Hull	purchased	2	519	Heine;	3	895	..	2 ¹	2,750	G. E. Curtis	..	..	..	..	..
Mansfield	purchased	..	..	Stirling	3	895	..	..	..	Triumph; Ft.	..	..	..	..	..
Norwood	purchased	..	..	..	4	680	..	..	..	Wayne;	..	..	..	..	..
Plymouth	both	4	1,000	Robb;	..	..	..	..	..	Alis-Chalmers	..	..	..	..	..
Reading	generated	3	375	Babcock	2	1,000	..	..	..	Stanley	..	..	..	..	..
Sterling	purchased	..	..	Kendall	4	1,380	..	..	..	..	..	..	..	..	..
Taunton	generated	6	1,800	Hodge	2	1,200	..	..	..	..	..	..	..	..	..
Wakefield	purchased	..	..	Heine	..	..	..	..	..	..	..	..	..	..	..
Wellesley	purchased	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Michigan:															
Coldwater	generated	3	600	Murray;	1 ¹	..	..	..	..	..	..	..	..	..	..
Durand	generated	2	400	Wicks	2	600	..	..	..	..	..	..	..	..	..

For footnotes, see page 816.

City	Generated	2	375	Murray:	2	245	Murray: Erie	3	160	G. E. Bullock	none	100	1,250	none	15	2,000
Schuyler	generated	2	250	Murray:	2	250	Murray: Erie	3	145	Ft. Wayne	none	15	600	..	all	..
Stanton	generated	2	300	Erie	2	450	Murray: Oids	3	350	Westinghouse	..	..	..	..	..	..
Wahoo	generated	2	300	Erie	2	450	Erie: Ideal	1	100	Ft. Wayne	125 k. w. Curtis turbine	55	285	30	37	..
New Jersey:	generated	2	300	Murray	1	100	Hewes & Phil	2	400	Ft. Wayne	300 h.p. water-power	142,000	540	250	7	..
Chatham	generated	2	450	Heine	2	650	Hewes & Phil	2	200	Gen. Elec.	..	6	370	..	8	..
Orange	generated	2	450	Heine	2	650	Ham.: Allis	2	300	Gen. Elec.	..	1,253,638	1,059	1,020	137,319	2,500
New York:	generated	2	450	Heine	2	650	Ham.: Allis	2	300	Gen. Elec.	..	209.6	2,130	..	30	..
Boonville	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Fairport	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Ilion	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Malone	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Port Byron	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Rome	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Schenectady	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Solvay	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Springville	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Westfield	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
North Carolina:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Edenton	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Gastonia	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
High Point	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Norfolk	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Stateville	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
North Dakota:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Grafton	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Hillsboro	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Valley City	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Williston	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Ohio:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Arcanum	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Bryan	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Bluffton	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Cuyahoga Falls	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Elyria	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Galion	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Granville	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Huron	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Jackson	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Montpelier	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
St. Bernard	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
St. Mary's	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
St. Paris	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Troy	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Oklahoma:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Clinton	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Kiowa	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Lindsay	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Perry	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Tonkawa	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Oregon:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Ashland	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Pennsylvania:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Ephrata	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Lehighton	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Media	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Mifflinburg	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
South Carolina:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Anderson	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Union	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Tennessee:	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Gallatin	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Humboldt	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..
Trenton	generated	2	450	Heine	2	650	Russell	3	399	G. E.	..	85	..	..	..	..

For footnotes, see page 816.

TABLE I.—STATION AND STREET LINES EQUIPMENT (Continued).

City and State	Source of Current	Boilers		Engines		Generators— Size No. k. w. Make	Other Sources of Power	Length of Wire Poles in Streets where or feet.	Poles in Else- Miles Conduits	Length of Streets With Wire Miles	Length of Streets Buried Cable
		No.	h. p.	No.	h. p.						
Texas:											
Ft. Worth	generated	2	800	2	2,000	1 150 G. E.		139.3	2,272	340	5 1/2
El Paso	generated	5	1,400	2	500	2 450 G. E.	2,500 k. w. from water power	15	400		
Virginia:											
Lynchburg	generated	2	800	2	2,000	3 1,000 G. E.	2,400 k. w. from water power	270	2,097	8	
Martinsville	generated	2	800	2	2,000	6 3,100 G. E.		12	320		
Richmond	generated	2	800	2	2,000						
Washington:											
Centralia	generated	2	800	2	2,000	3 950 Allis; Ft. Wayne		60	700	8	
Ellensburg	generated	4	2,500	1 1,800	1 7,500 kw. Allis-Chal.						
Seattle	generated	4	2,500	1 1,800	1 7,500 kw. Allis-Chal.						
Wisconsin:											
Algoma	generated	3	310	2 230	1 35			3,900	29,900	1,957	165,000
Barron	both	2	300	2 275	1 35	Vilter; Skin- Fairbanks- Morse					
Fennimore	both	2	300	2 275	1 35	Ames; Allis-Chal.					
Florence	both	2	300	2 275	1 35	Nash Gen. Elec.					
Jefferson	both	2	300	2 275	1 35	Nordberg; Allis-Chal.					
Kaukauna	generated	2	300	2 275	1 35	Minneapolis					
Lancaster	generated	2	300	2 275	1 35						
New Lisbon	generated	2	300	2 275	1 35						
Oconomowoc	generated	2	300	2 275	1 35						
Port Washington	generated	2	300	2 275	1 35						
Richland Center	generated	2	300	2 275	1 35						
Shawano	generated	2	300	2 275	1 35						

Footnotes.—* Turbine; * Not operated; * Gas or oil; * Small quantity generated at times; * Steam is purchased; * Gas producer.

TABLE II.—CURRENT GENERATED AND BOUGHT.

City and State	Current Generated or bought —1916.	Current Used for Street Lighting.	Current Generated or bought —1916.	Current Used for Street Lighting.	Current Sold for Commercial Purposes.	Voltage on Main Line.	A.C. or D.C.	Phase.	Voltage on Main Line.
Alabama:									
Alexander	180,000	36,000	144,000	110	338,797	230	D.C.	1-3	110-220
Cullman	150,000	54,000	9,000	2,300	175,000	110-220	A.C.	2	110-220
Piedmont	150,000	No meter	9,000	2,300		2,300	A.C.	3	2,300
Tuskegee	150,000	No meter	9,000	2,300		2,300	A.C.	3	2,300
Arizona:									
Glendale	142,000	3,186	111,054	2,200		1,100	A.C.	1	1,100
Arkansas:									
Hopewell	1,200,000	1,200,000	None	2,200	25,855	2,300	A.C.	3	2,300
Little Rock	1,200,000	1,200,000	None	2,300		2,300	A.C.	3	2,300
Pine Bluff	4,416,730	135,000	3,356,730	2,300		1,100	A.C.	1	1,100
California:									
Riverside	1,553,000	295,890	814,419	15,000	751,952	2,300	A.C.	3	2,300
Glendale	1,553,000	668,534	3,402,306	33,000 to 110	No record	2,300	A.C.	2	2,300
Concord	5,507,350b	145,000	300,000	110-2,300	122,835	2,300	A.C.	3	2,300
Connecticut:									
Norwalk	967,880	109,785	634,889	2,400-1,200	No record yet—just beg. operation	2,300	A.C.	2	1,150
South Manchester	1,017,524	163,716		110-220	132,302	2,300	A.C.	3	2,300
Delaware:									
Wilmington	15,023,650	1,564,600		110-2,200	1,568,639	2,300	A.C.	3	2,300
Florida:									
Jacksonville	85,000	10,000	5,000	2,300	227,956	2,300	A.C.	1&2	2,300
Tallahassee	727,700			2,300	1,493,583	2,300	A.C.	2	2,300
Georgia:									
Acworth	727,700			2,300	1,493,583	2,300	A.C.	3	2,300
Dublin	127,700			2,300		2,300	A.C.	3	2,300
Jackson	127,700			2,300		2,300	A.C.	3	2,300
Norfolk	843,000			2,300		2,300	A.C.	3	2,300
Nebraska:									
Omaha	96,000	84,000	300,000	110	130,847	110-220	D.C.	1	110-220
Social Circle	96,000	84,000	300,000	2,300	70,000	2,300	A.C.	3	2,300
West Point	1,250,000			2,300		2,300	A.C.	3	2,300
Idaho:									
Boise	489,000			4,000	55,404	2,300	A.C.	3	2,300
Idaho:									
Boise	489,000			4,000	55,404	2,300	A.C.	3	2,300

[illegible]

a—Record for nine months. b—26,350 kw. generated; 5,481,000 bought.

[illegible]

For footnotes, see page 321.

[illegible]

TABLE IV.—OPERATING EXPENSES.

TABLE IV.—OPERATING EXPENSES.															
City and state	Cost of fuel used	Wages at station	Cost of water	Oil and waste	Station repairs	Steam plant repairs	Electric plant repairs	Tools and appliances	Total cost of manufacturing	Cost of wages for distribution	Line and conduit pair and renewal	Lamp, meter and repair and renewal	Other expenses for distribution	Total cost for distribution	Total cost for entire kw.
Alabama:															
Cullman	\$4-\$5.50 ¹	\$47.25 ²							\$700.00 ³	4.00					
Tuskegee	\$3-\$5 ¹														
Arizona:															
Glendale															
Arkansas:										\$291.85 ⁴				\$4,230.92	3.00 ⁵
Hope	9,889.16	11,696.28 ¹⁶								0.50				6,029.43	0.50
Little Rock	4,488.61	1,890.00		\$96.51	\$500.00				0.50	4,406.85	\$1,220.45			7,081.53	1.80
Pine Bluff	28,481.53	6,475.58	\$122.44	194.12	1,352.38	\$659.19	\$693.19	\$68.86	19,590.00	2.98	2,387.87	\$2,078.00		18,469.00	0.45 ⁹
California:															
Alameda	21,390.00	14,481.00							405.02	0.95				11,714.74	0.45 ⁹
Glendale														25,324.48	0.45 ⁹
Riverside	1,354.91	774.18		186.00	87.52	119.86	400.33		8,002.03	2.80 ¹³				18,469.00	0.45 ⁹
Connecticut:															
Norwalk	3,901	390.00 ²	.05 ⁶						4.00					11,714.74	0.45 ⁹
Wallingford	4.42 ¹								2%					25,324.48	0.45 ⁹
Delaware:															
Lewes	1,919.77	4,014.03									50.00	75.00			
Florida:															
Jacksonville	88 ¹²	23,616.54		398.15					0.76	0.86					
Tallahassee	3.50-4.00 ¹	175.00 ³	30.60 ³	30.60 ³											
Georgia:															
Acworth		700.00		50.00	25.00										
Newman		135.00													
Melgs	2.00	160.00													
Moultrie	7,200.00	3,000.00		312.00	90.00										
West Point	3.75 ¹	2,400.00		120.00	300.00			75.00	0.01 ¹⁰	1.75					
Illinois:															
Altamont		180.00 ²	75.00	20.00	100.00								500.00		
Columbia	2,805.00	1,600.00		100.00											
Galesburg	5,000.00	3,000.00	free						1.1 ¹⁴	2.50	2,000.00				
Highland	2,000.00	2,340.00	50.00	145.00	250.00		500.00		6,500.00	2.00	500.00				
Metropolis	5,000.00	5,000.00								1.4					
St. Charles ¹⁵	6,007.70	3,600.00		624.50		250.52	137.72	37.50							
Stonington	3,600.90	612.00		225.00	175.00	75.00					1,800.00	50.00		1,800.00	
Indiana:															
Bluffton	11,464.70	5,400.00	400.00	400.00	600.00	200.00	200.00	150.00	30,767.02	3.54 ⁸	1,575.50	95.00	50.00	1,895.50	0.22
Bremen	1,200.00	1,200.00													0.3
Crawfordsville	11,270.45	5,960.35		68.30	1,903.89				20,141.25	0.64 ⁸	898.22	694.33		3,308.06 ¹¹	0.3
Frankfort	25,629.06	11,721.98			3,365.22				44,353.24	1.3	2,741.57	309.91	1,200.43		
Greenfield	5,087.33	2,160.00	317.20	100.00		3,636.98			18,007.60	4.00	550.00	498.00	221.00		
Kendallville	7,124.61	2,784.03		497.09	15.50				10,421.23	1.3				865.29	0.9
Mishawaka		1,750.00													
Peru	24,378.08	2,808.85							28,835.05	1.3					
Rushville	19,717.61	5,091.81	214.06	429.57	300.00	637.17	4.57	302.44	32,985.59	0.51	992.89		14,531.01	3,099.28	0.16
South Whitley	9,800.00	6,250.00												23,624.00	1.4
	70.00														
	2.95 ¹														

For footnotes, see page 823.

[illegible]

¹per ton. ²per month. ³Total operating labor cost. ⁴Includes cost of power, interest on bonds, etc. ⁵per 1,000 gallons. ⁶per barrel. ⁷At switch board. ⁸Bought at this rate. ⁹Includes water department figures. ¹⁰General and other. ¹¹Covers last nine months. ¹²Depreciation and interest. ¹³October 1st, 1916, to May 1st, 1917. ¹⁴Slightly more than one cent. ¹⁵All expenses other than fuel.

(Continued from page 811.)

heating, one-fourth of the plants obtaining more or less revenue from such services. The greatest need of most plants is a further development of services requiring daylight use of current.

The figures and statements tabulated were given in response to the following questions:

Table No. 1.—Station and Street Lines Equipment—Boilers: number, total rated horsepower, make. Engines: number, total rated horsepower, make. Dynamos: number, total kw. capacity, make. Other sources of power. Total length of wire. Number of poles set in street. Number of poles set elsewhere. Total length of streets in which wires are overhead. Length of underground conduits containing lighting wires. Length of buried cables without conduit.

Table No. 2.—Current Generated or Bought During Latest Fiscal Year—Total: amount used for street lights, sold to commercial customers. Is current on main circuit A. C. or D. C.? phase, volts.

Table No. 3.—Connected Load Statistics—Number of public arcs for street lighting, kinds used, and watts or candlepower of each. Number of public incandescents used for street lighting, kinds used and watts of each. Miles of streets lighted with arc lamps; with incandescent lamps. Hours street lamps burn per year. Number of commercial arcs; of commercial incandescents. Total lighting load. Number of motors served. Total power load. Amount used for cooking, heating or other services. Do you replace burned-out bulbs?

Table No. 4.—Operating Expenses, Latest Fiscal Year—Cost of fuel used; of wages at station; of water; of oil and waste; of station repairs; of steam plant repairs; of electric plant repairs; of tools and appliances. Total cost of manufacture; total cost per kw. h. made. Cost of wages for distribution; of repairs and renewals of lines and conduits; of repairs and renewals of meters, lamps and motors; other expenses of distribution; total cost of distribution; total cost per kw. h.

REPLACING LAMPS FREE.

Of the two hundred cities reporting, only fifteen replace burned out incandescent lamps free of charge, and most of these limit this to carbon filament and gem lamps; although several sell these and mazda lamps at cost or less. One of those renewing lamps free is St. Louis, which gives Mazda B, clear, 40-watt to 500-watt; Gem, clear, 30-watt to 100-watt; Gem, frosted and pear shaped, 30-watt and 60-watt, and carbon, 10-watt. A renewal charge is made for frosted Mazda B, round or pear shaped; all Mazda C, clear or frosted; all Mazda from 5-watt to 25-watt; and round carbon lamps, clear or frosted.

ELECTRIC COOKING AND HEATING.

About 25 per cent of the cities reporting in this issue derive some income from the use of current for cooking and for heating. One of these, Wallingford, Conn., in its report for 1916, states that the increased use of the electric range for cooking has played a large part in making up the decrease in current used for lighting that resulted from the substitution of Mazda lamps for the old carbon filaments. During the year 12 standard electric ranges were installed, and all of those using them are said to be greatly pleased with the results. In one case, at least, all of the cooking was done with the electric range, the coal range having been taken out to make room for it; and the bill did not exceed \$1.90 for any month. At the end of the fiscal year the municipal power

plant had an estimated connected heating and cooking load of 520 kw. capacity.

The desirability of interesting the people in electric cooking is shown by the manager and superintendent of the Wallingford plant, A. L. Pierce, who states in his report that "Any great increase in income must come along these lines of power and heating, as the lighting field is becoming more limited." In many cities it is probable that the increase in number of lamps due to natural growth of population does not more than compensate for the decreased current consumption per lamp, and in some cases may not equal it. If there is an actual reduction, then, even though the profits of the company may be as great as before, the plant will have a surplus of energy which should be utilized for some purpose. In addition to this, a large part of the cooking will take place before the evening peak load, and this, of course, will be a decided advantage.

JOINT WATER AND LIGHT PLANT.

Dublin, Ga., operates its water and light plants jointly, using the same station, boiler plant, etc. for both. The commission in charge is convinced that this joint operation results in considerable economy. In their annual report they say: "Basing the calculation on the indicated efficiency of our steam and electrical units, it was determined that in the matter of fuel consumption seven pounds of coal were required to develop one kilowatt-hour, whereas considered jointly with the water, 5.75 pounds of coal per kilowatt-hour is more proportional to the horsepower required for each unit operating under similar conditions. The same principle applies to the operating force, etc. It appears that the element of higher efficiency found in the combined plant is of paramount importance."

COST OF LIGHTING IN TOPEKA.

The relative cost of generation, distribution and overhead for lighting service in a city of medium size—Topeka, Kans., 50,000 population—during the past four years has been as follows: Generation per kw-h at the switchboard—43 per cent, 39 per cent, 38 per cent and 35.7 per cent respectively; distribution and lamp upkeep—17 per cent, 18.5 per cent, 23.6 per cent and 24 per cent; overhead 40 per cent, 42.5 per cent, 38.4 per cent, 40.3 per cent. It appears from this that only a little over a third of the total cost of current is that of manufacture, and that about 40 per cent is overhead charges. Of the overhead, about 11½ per cent was administration, 15½ per cent taxes, 32 per cent interest, 36½ per cent depreciation, and 4½ per cent insurance. The costs per kw-h in 1916 were 1.51 cents for generations, 1.02 for distribution and lamp upkeep, and 1.70 for overhead. It would therefore seem to be impossible, by any economy, to reduce the overhead by more than 5 or 6 per cent or to less than 1.6 cents per kw-h.

The relative cost of 400 c.p. and 80 c.p. tungstens used for street lighting was \$33.03 and \$15.87 per year respectively, each being for 3,240 hours. Although one lamp was nominally five times as powerful as the other, the cost for the larger was 3.3 that of the smaller for current, one-half as much for transmission service, 3 times as much for renewals, 0.7 as much for repairs to circuits, and practically the same for cleaning and patrolling. Interest, taxes and depreciation were given as \$9.60 and \$4.92 per lamp, respectively, and the total cost of the larger lamp was little more than twice that of the lamp of one-fifth the intensity.

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DO IT ELECTRICALLY.

Probably not one-fourth of the charge for electricity, on the average, represents the cost of generating the power; consequently any increase in current used when machinery and power employees are comparatively idle, in the off-peak hours, could be sold to advantage for one-third the price for peak-load service. A plant that supplies only lighting service is losing a considerable part of the interest on its plant and wages of its power-house force through the comparative idleness of these men about half the time, and of the machinery 80 per cent of the time. The great opportunity for increasing profits lies in filling these valleys without materially increasing peaks or plant capacity; that is, in increasing the load factor.

The use of current for service that is or can be done during the day time, or between 11 P. M. and daylight, is therefore something the people should be educated into. Even at somewhat greater cost, electricity is so much handier, neater, more compact, and safer as a fire risk than gasoline motors that it should easily supplant them in most services. But if an electric department delivers motors to its customers in a car bearing the advice, "Do It Electrically," and that car is propelled by gasoline, the citizens are sure to do some thinking that will not be favorable to electric power. No matter what the explanation, they are liable to decide that if the electric department or company, to whom current is cheaper than to them, does not find it wise to use electricity instead of gasoline, they certainly would not. So that, even if the electric truck should cost a little more to operate than a gasoline one, it should be used by electric departments.

But in the majority of cases it probably would

not be more expensive, and hundreds are being used for city service throughout the country. An article in this issue gives considerable information concerning actual practice in their use by a number of electric companies, all of which have rapidly electrified their street transportation service. Such cars help to advertise the use of electricity for other services, but also for electric vehicles themselves, and the charging of such vehicles in off-peak hours is a very desirable business which it pays to promote.

PURCHASING CURRENT FOR DISTRIBUTION.

With each year the number increases of the cities that, while operating an electric lighting service, purchase the current rather than generate it. Ordinarily this is especially economical for small communities. It is no reflection upon the management of an electric plant that it can purchase current more cheaply than it can manufacture it. It may be that the power company from which the current is bought has cheap hydraulic power which the electric plant does not possess; but even if not, current can be generated in large quantities and distributed for considerable distances at less cost per kwh. than it can be generated in small quantities.

The reason for this is not difficult to appreciate. A turbo-generator unit of 60,000 kva. takes up little more floor room than one of 1,000 and requires practically no more attention, and the cost is nowhere near sixty times as great; so that the only item of cost of generating current that is anything like as great per kw. for large as for small plants is the fuel. It would therefore be perfectly possible for a small plant to be operated as efficiently, within its limitations, as a large one, and still run up a cost per kw-h. double that of the latter.

Of the plants in all sections of the country reporting the data tabulated in this issue, nearly 25 per cent purchased all the current sold and 5 per cent purchased part. Connecticut, Massachusetts and North Carolina seem to lead in this respect, in each state approximately three-fourths of the cities reporting purchasing the current used. Taking Massachusetts as an illustration, 39 municipalities in that state operated lighting plants in 1916; and of these, 25 purchased all the electricity distributed. While these were, in number, 64 per cent of the total, their population was but 30.3 per cent of that of all the municipalities, owing to the fact that the smaller towns were more general purchasers of current.

In the case of privately owned plants only about ten per cent of the current distributed was purchased, 25 private companies purchasing all current distributed. But the distinction between municipal and private plants in this respect is more apparent than real, for 79 companies served 270 communities, and current generated in one and distributed to a number of others (38 in one case) was not counted as "purchased"; that is, there were $3\frac{1}{2}$ times as many municipalities served by private companies as there are companies; while there were less than three times as many municipalities using municipal service as there were municipal plants.

It therefore would appear that in that state about two-thirds of the municipalities were served with current generated elsewhere. On the other hand, in several states, such as Iowa, Michigan and Nebraska, practically all municipalities generate their own current. From the figures at hand it would appear that the only states in which more than thirty per cent of the municipalities purchase their current lie on the Atlantic coast, with the exception of Wisconsin.

PROGRESS IN USE OF ELECTRICITY*

Enormous Increase in Loads During 1916—Reduction in Cost of Plants—Nitrogen Filled Lamps—Power, Heating and Cooking.

During 1915 the wave of economy and retrenchment that swept the country affected to a great extent the central station industry. The past year, however, has witnessed tremendous increases in loads; so great in fact that some of the large power companies have been unable to furnish service when requested. These enormous increases in load quite naturally created a demand for larger generating and transformer units. Last year the largest turbo-generator unit was one having a rating of 47,000 kva. Progress in this branch of the industry continues very active, and recently a certain central station contracted for a unit rated at 70,800 kva, and another company has recently ordered a 60,000-70,000 kva unit. These extremely rapid increases in the size of generating units have been accompanied by corresponding developments in condensers, boilers and furnaces, and surprising economies are being secured by the use of these large units.

The cost per unit of capacity of an electric power station today is about one-third of similar costs fifteen years ago. For instance in 1900 a number of 5,000 kw units installed in New York cost over \$40 per kilowatt, whereas units of 30,000 kw and over have recently been installed for \$9 per kw, including condensers. In addition to the reduction in investment costs, it has been found possible, in a great many cases, to install these large units in the same space occupied by older and smaller ones.

Economies have been increased from three pounds of coal per kwh for some of the early machines of 5,000 kw to 10,000 kw capacity, to one and one half pounds per kwh for the modern turbines of larger sizes.

In the transformer field the year has been marked by decided increases in the number of units rather than by startling increases in capacity and voltage. The largest single-phase transformers of the year were rated at approximately 14,000 kva at 150,000-13,200 volts; in the three-phase class the record seems to stand at 16,000 kva at 102,000 volts.

The use of outdoor sub-stations, including transformers, switching apparatus, meters, etc., seems to be growing in favor, especially in this section of the country where excessive sleet storms do not give trouble.

ILLUMINATION, HEATING AND POWER.

The more general use of the nitrogen filled incandescent lamp, not only for residence and commercial lighting, but also for street illumination, has been most marked during the year just passed. The adoption of this type of lamp tends to lower the demand, not only on the distributing lines and transformers of the company supplying service, but also the demand on the generating station. Thus no doubt many central stations that a few years ago faced the necessity of purchasing additional equipment in the shape of boilers, engines and generators, have been able to tide over this condition and take on additional service without the necessity of spending more money for generating equipment.

Street lighting is rapidly growing away from the use of the arc lamp and the standard of such lighting is approaching the use of the smaller unit of the nitrogen filled lamp, the lamps being placed not only at the cor-

ners but midway the blocks, with a view of obtaining a more even distribution of illumination. This adoption of the small incandescent unit of illumination for street lighting not only has caused a better lighting of the streets, but it has enabled the lighting companies to make savings in the way of carbons, outer and inner globes, etc., and often a saving in the current generated.

The electric heating load in this section of the country has not shown exceptional growth. True, a fair number of small room heaters are in use, but generally this load cannot be obtained by the average electric station, as the customer generally wishes to use the heater from the existing house wiring and such use is practically prohibitive at the existing lighting rates. Only one case is recorded in this section where large amounts of current are used for heating. This is in the Ford factory in Atlanta where two 300 hp electric enameling furnaces are in use.

Electric cooking has progressed very satisfactorily during the past year. A considerable number of electric ranges have been sold by manufacturers and lighting companies and their performance seems to be entirely satisfactory. Special rates are of course necessary in order to successfully get this business, and rates from 5 cents to 3.5 cents per kwh are now being quoted. Such business, coming as it does almost entirely off peak, tends to increase the load factor and thus lower the average manufacturing and distributing cost per kwh without causing a heavy additional investment for lines and transformers. Attention should also be called to the advantages to be gained by pushing the sale and use of the small heating and cooking devices such as percolators, toasters, grills, water heaters, irons, etc. Loads such as these can be made extremely profitable if properly handled, and the use of the articles mentioned serves to popularize the use of electricity and to increase the consumption by residence consumers.

During the past year there has been a very great increase in the demand for electric power and this demand is growing daily. Naturally there has been a tremendous corresponding increase in the number of types and sizes of electric motors, specifically adapted to all sorts of uses. This may best be illustrated by the fact that one manufacturing concern alone now manufactures some 3,000 standard motors, each differing from every other in some radical feature. These motors vary in size from the fractional horse power to the large seven and eight thousand horse power for steel mill machinery and maximum ratings of 15,000 to 18,000 horse power will soon be put in operation. Unfortunately the demand for electric motors has been in excess of the manufacturing resources of late and the delay in filling orders has no doubt greatly inconvenienced not only the electric light stations but the many customers who were desirous of using electricity as a motive power.

INDUSTRIAL AND ELECTROLYTIC PROCESSES.

In connection with electro-chemical services, electricity is not simply an economy or a convenience, it is an absolute necessity, vital to the industry. It is used in large volumes and is used direct, that is, it is not transformed into mechanical energy. The science of electro-chemistry has made wonderful advances the past year and its arts have become essential to the needs of our country. Nitrogenous products for munitions and for agriculture, abrasives and aluminum, are among the important creations.

Huge electric furnaces for the production of high-

*From report of W. Rawson Collier, chairman of Committee on Electrical Affairs, to the Tri-State Water and Light Association of the Carolinas and Georgia.

grade steel for tools, shells, etc., have now been in operation for some months and new installations are reported almost daily. With the heavy demands now being made for war munitions, it can be confidentially predicted that the coming year will show wonderful progress in this phase of the business.

BAKING BY ELECTRICITY.

At the St. Stanislaus Seminary, in St. Louis, is an electric cooking outfit with a capacity of 300 ovens at a baking. There are three ovens, each with four shelves 30 by 38 inches. The heating units, of the ribbon type, are located in the base, from which the heated air passes up flues in each side of the oven and over each shelf. To heat the ovens to 480 degrees requires 90 minutes and 60 kwh. of current; while 30 to 50 minutes is required for baking the bread. This outfit was first put into use in February of this year.

TREATMENT OF POLE BUTTS

Materials Used For Prolonging Their Life—Applying By Brush and By Open Tank Process.

The life of untreated wooden poles for carrying wires varies widely with the kind of wood, soil and climate. In Iowa the serviceable life of a 35-foot, 7-inch-top cedar pole is estimated by operating engineers to be about 15 years. Chestnut is not so durable as either northern white cedar or western red cedar.

Decay of wood is due to fungi or bacteria that feed upon it, and these require a certain amount of heat, air and moisture to live. If any one of these three is lacking the organism can not act upon the wood. Preservatives to be successful must therefore keep heat, air or moisture from the wood, or poison the organisms. The first would seem to be impracticable.

Creosotes and other distillates of coal tar are the preservatives most commonly used; although asphalt and water gas tar are used to some extent. Among the high-grade distillates of coal tar used for preserving poles are "S. P. F. Carbolineum," "Avenarius Carbolineum," "C. A. Wood Preserver" and "Carbosota." Other preservatives are "Timber Asphalt," "Spirittine," "Wood Creosote," "Imperial Wood Preservative," "Locustine" and "Creoline." Most of these rely chiefly upon poisoning, together with more or less protection of the wood from moisture. Asphalt probably acts in the latter way only.

Preservatives are applied in one of three ways—by brush, by open tank treatment, or by the pressure process. The last is the most expensive, requires an elaborate fixed plant, and is seldom economical unless poles are very expensive or the life of untreated poles is very short.

Brush treatment consists in applying to the butt end of a pole one or two coats of hot preservative with a heavy brush, first preparing the butt for treatment. The temperature of the preservative should be from 180° to 200° F., and if two or more applications are given they should be at least 24 hours apart. The treatment is generally applied from the butt to a point about 18 inches above where the ground line will come.

It is very important that the poles be well seasoned and the butts carefully shaved so that there will be no dirt or loose pieces of bark to prevent a uniform penetration of the

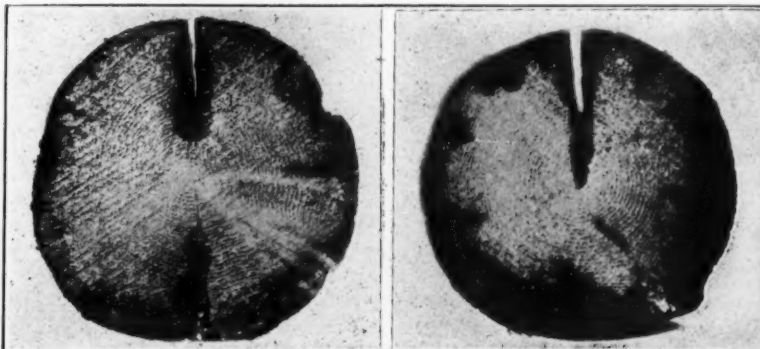
preservative into the pole. The depth to which the preservative enters the wood is considered a measure of the increase in the life of the pole that treating will contribute; and since the chief disadvantage of the brush process is the lack of penetration, it is essential that all unnecessary resistance to the absorption of the preservative be removed.

Recent observations by engineers of the American Telephone & Telegraph Co. indicate that poles treated with two brush coats are resisting decay much better than those that are given only one coat; but that very little, if anything, is gained by a third application. In many cases the second coat is applied to that part of the pole only lying between points 18 in. above and 24 in. below where the ground surface will come. The cost of two coats will be less than twice the cost of one, because less preservative will be absorbed on the second application, and the same preparation of butt serves for both.

The average cost of treating a 6-inch or 7-inch, 25-foot cedar pole is between 20 and 30 cents, based on cost data obtained from several operating companies in Iowa. The amount of preservative necessary to treat a 35-foot, 7-inch-top pole with two full coats is approximately three-fourths of a gallon. If only a partial second coat is given, one-half gallon may be sufficient.

In the open tank process the butts of poles are submerged in preservative. Standard specifications for such treatment have been adopted by the Western Red Cedar Association and recognized by the Northern White Cedar Association. These provide for three classes of treatment, known as "A," "AA" and "B." The first two differ only in that "A" uses carbolineum as a preservative and "AA" uses creosote. In each case there is continuous submersion in hot preservative for at least 15 minutes if the atmospheric temperature is 70° or higher, and longer if it is below 70°. The preservative is kept at a temperature between 215° and 180°, being raised to the former at least once every four hours.

In treatment "B" the poles are immersed in creosote, heated as above, for four continuous hours, and then transferred to creosote that is not allowed to get hotter than 112° at any time, remaining in the latter for two hours. The purpose of the cold treatment after the hot is to obtain deeper penetration into the wood. In the hot preservative the raising of the temperature of the wood expels a portion of the air in the wood cells. When the pole is suddenly submerged in the cold bath a partial vacuum is formed in the interior and the preservative is forced into it by atmospheric pressure. This method requires a considerable amount of heavy equipment and is not often employed except by companies using large numbers of poles. It secures a deeper penetration, as is shown by the illustration, and therefore increases the life of the pole.



CROSS SECTION OF POLE
GIVEN TREATMENT AA.

CROSS SECTION OF POLE
GIVEN TREATMENT B.

*Abstract of bulletin of the Engineering Extension Department of Iowa State College.

The WEEK'S NEWS

State Highway Developments in Illinois, Texas and West Virginia—Inspecting Food Supplies in New York City—City Water Plant Not Regulated by State Commission—Cleveland's Municipal Heating Plant Loses Money—\$2,000,000 Hydro-Electric Bonds for Los Angeles Defeated—Two-Platoon System Loses in Portland, Ore., Election—Governor Whitman Vetoes Central Purchasing for New York City—"Three-Family Houses" Permitted in New York—Indiana Public Service Commission Investigates Coal Prices—New Jersey Cities to District—Experts to Design Army Cantonments.

ROADS AND PAVEMENTS

Illinois to Vote on \$60,000,000 Road Bonds.

Springfield, Ill.—The legislature has finally, after many conferences, passed the Meentz bill, authorizing the building of hard roads at a cost of about \$60,000,000. About 4,400 miles will be constructed with this sum, it is expected. The routes throughout the state to be improved number forty-six. Twenty-year serial bonds are contemplated, at interest not to exceed four per cent. According to the legislation the necessary funds are to come principally from auto taxes. A referendum election on the proposition is to be held throughout the state in November, 1918. The terms of the bill in the form for presentation at the election provide: "For construction by the state, acting through its department of public works and buildings subject to the governor's approval, of a state-wide system of hard roads on routes described for control and maintenance and for conditional compensation for roads already paved; gives such department full power to execute such act; authorizes state to contract a debt for such purpose and to issue \$60,000,000 serial bonds, bearing interest annually at not to exceed 4 per cent; appropriates said sum to such department; levies a tax to pay said interest annually, as it shall accrue, and to pay off bonds within twenty years from issuance, but provides that such payments may be made from other sources of revenue, and requires moneys in the motor vehicle 'road fund' to be first used for such payments and such direct tax to be omitted in any year in which sufficient money from other sources of revenue has been appropriated to meet such payments for such year."

No Payment for Damages to Roads by Troops.

Washington, D. C.—Secretary of War Baker, acting upon advice of officials of the Southern Department, has rejected the application of several counties in Southern Texas for remuneration by the government for alleged damage to county roads caused by the mobilization of National Guard along the border. Secretary Baker wrote: "It appears that the United States has spent a large sum in repairing these roads and that the roads are now in at least as good condition as they were at the time the military operations commenced. It also appears," the secretary continues, "that the counties may have been required to spend more for repairs on these roads than they would have spent had not the military operations taken place. The extra expense to them, however, is very difficult to determine and as a matter of equity and justice it is not believed that they are entitled to reimbursement for the same, since the presence of the army was necessary for their protection and incidentally was of material benefit to them in a business way. Moreover, for the United States to pay the excess cost of repairs to the counties would be equivalent to paying a toll for the use of the roads and would be establishing a precedent that might be exceedingly troublesome." In conclusion Secretary Baker states: "There are no funds in the hands of the department which are available for reimbursement of this character." The Southern Department report, signed by Col. W. C. Langfitt, shows that for 1,762 miles of road involved the estimated value of total damage due to military traffic since July 1, 1916, was \$37,430.20. In return it is shown that the army spent \$6,953.42 for animal or army troop labor used for repairs and improvements, while it is further estimated that the sum of \$85,898 was

spent for repairs and improvements, making a total of \$92,851.42 actually spent by the government. It is further shown, by way of comparison, that while the government was spending this sum for road betterments the various counties were spending but \$17,718.38 for the same highways. The Texas counties over whose roads the military movements passed and the amount of mileage involved are: Cameron, 177; Hidalgo, 195; Starr, 33; Zapata, 55; Webb, 122; La Salle, 42; Frio, 34; Medina, 52.6; Atascosa, 1.7; Bexar, 65.4; Guadalupe, 3.75; Comal, 19; Hays, 21; Travis, 11; Zavalla, 46.4; Dimmit, 35; Maverick, 80.7; Uvalde, 38.2; Kinney, 40; Val Verde, 29; Brewster, 261; Presidio, 186; Jeff Davis, 38; El Paso, 175. The report shows that Bexar County, whose roads were subjected to a harder strain than any other county in the state because of the great body of troops stationed at Fort Sam Houston, received no money from the government or the donation of a man or animal labor for the repair of its roads, all of the maintenance and improvement work being borne by the county. The report further points out that no application for Federal reimbursement was made by County Judge Davis of San Antonio. The total mileage used by the government along the border in the states of Texas, New Mexico and Arizona was 2,413 and it appears, according to Colonel Langfitt, that on February 1, 1917, the total damage done to all roads along the border was about \$60,265.44 and that the government had spent about \$103,425.72 on repairs or improvements. "Since that time," he writes, "the military traffic has been much lighter and weather conditions more favorable. Expenditures by the government have continued and have been more than the value of any possible injuries. The total improvements made by the government along the border appears to be far in excess of the damage done by the transportation. It is probable that the gain more than overbalances the loss in every instance and the counties could well afford the slight increase in road tax required to meet any increased expenditure caused by army traffic."

The Texas State Road Commission.

Austin, Tex.—Governor Ferguson has announced the names of his appointees to the state highway commission. George H. Duren is to be state highway engineer and the commission, to be under the chairmanship of Curtis Hancock, Dallas, is to include T. R. McLean, Mount Pleasant, and H. C. Odle, Meridian. On July 1 the new auto tax license law goes into effect and the commission is to prepare a system of registration. About 175,000 motor vehicles are to be licensed and \$1,500,000 a year will be received in revenues from them, it is estimated. Mr. Duren was formerly city engineer of Corsicana and he is to receive a salary of \$5,000.

West Virginia's New Highway Commission.

Charleston, W. Va.—Appointment of the state road commission, authorized by the legislature in its last regular session, has been announced by governor Cornwell. A. D. Williams, who has been chief road engineer for the state for several years, was the Republican member of the commission he named, and T. S. Scanlon, of Huntington, former county commissioner of Cabell County, was named as the Democratic member. Their commissions date from June 1. The commission will organize for business at once and will have its offices in the senate chamber. In announcing the names of the members of the commission governor Cornwell made this statement: "I have investigated every charge that has been made against Williams, whether that

charge was made by Republican or Democrat, and the file on the subject is open to inspection. None of them were sustained, including the one as to his political activities. His knowledge of conditions in the state made it imperative that he be put on the commission." Mr. Scanlon has been connected with contracting work on the construction of highways and railways from his early boyhood. He has been in the contracting business himself for fourteen years. He was street commissioner and city treasurer of the city of Huntington for five years, during which time and under his direction much of the pavement in that city was done. Under the new charter for the city of Huntington he was commissioner of finance, taxation and public utilities for the city of Huntington for three years.

SEWERAGE AND SANITATION

Los Angeles Again Disapproves Sewage Treatment.

Los Angeles, Cal.—By a large majority the voters at the recent special election again turned down the proposition to issue bonds for the construction of a sewage-treatment plant. This was despite the fact that the city has been ordered by the state health board to build such a plant. The proposition received the support and recommendation of the city Municipal League. The plan was to issue bonds for \$1,750,000 for a big plant located at Hyperion, which was to treat 97 per cent of the city's sewage and for a small plant to serve the San Pedro district. The city will now be forced to levy taxes to cover the cost of the improvement. A new sewer is being built by the city to replace the last two tunnels on the old outfall sewer and also a new 2,000-foot ocean outfall sewer and pier. This work is being done by force account from the general fund. The Hyperion plant is to include Imhoff tanks and sludge beds.

Food Inspection in New York.

New York, N. Y.—In response to inquiries relating to the charge that foods were being displayed without being covered against dirt, dust and flies, health commissioner Emerson has issued the following statement: "Arrangement was made August, 1916, by cooperation between the police and health departments whereby food exposures on the public streets or violations of food ordinances occurring on the public highways should be handled by the police department on reference by the department of health or on their own initiative. This arrangement applies to the entire city. Daily and weekly reports of unsanitary conditions observed by food inspectors of the department of health are forwarded to the police commissioner. These are immediately referred to the chiefs of the various inspection districts of the police department in the various boroughs, who obtain compliance with the ordinances through reference to their police captains and the patrolmen on the beat where the violation is observed. Copies of reports of the inspectors in reply to communications of the commissioner of police are returned to the department of health. In this way 10,000 officers of the law obtain com-

pliance instead of having the entire function of food inspection carried on by the small number of food inspectors, namely, twenty-six for the Borough of Brooklyn, and twenty-nine for the Borough of Manhattan, at the disposal of the department of health.

The following foods are required to be covered by glass: Confectionery, cakes, waffles, figs (dried), unwrapped candy, sliced pineapple, baked apples, cucumbers, pickled tomatoes, pickled fish, smoked fish, boiled corn, dried fruits, hominy, corn meal, tapioca, pot-cheese, pastry, breadstuffs, ice cream cones, dates, sliced watermelon, cut cantaloupe, candied apples, olives, pickled peppers, herring, cut fish, baked potato, barley, flours, oatmeal, cheese.

These foods must be covered with netting: Apples, pears, plums, peaches, apricots, tomatoes, strawberries, currants, raspberries, gooseberries, grapes, radishes, scallions, lettuce, horseradish, celery, watercress.

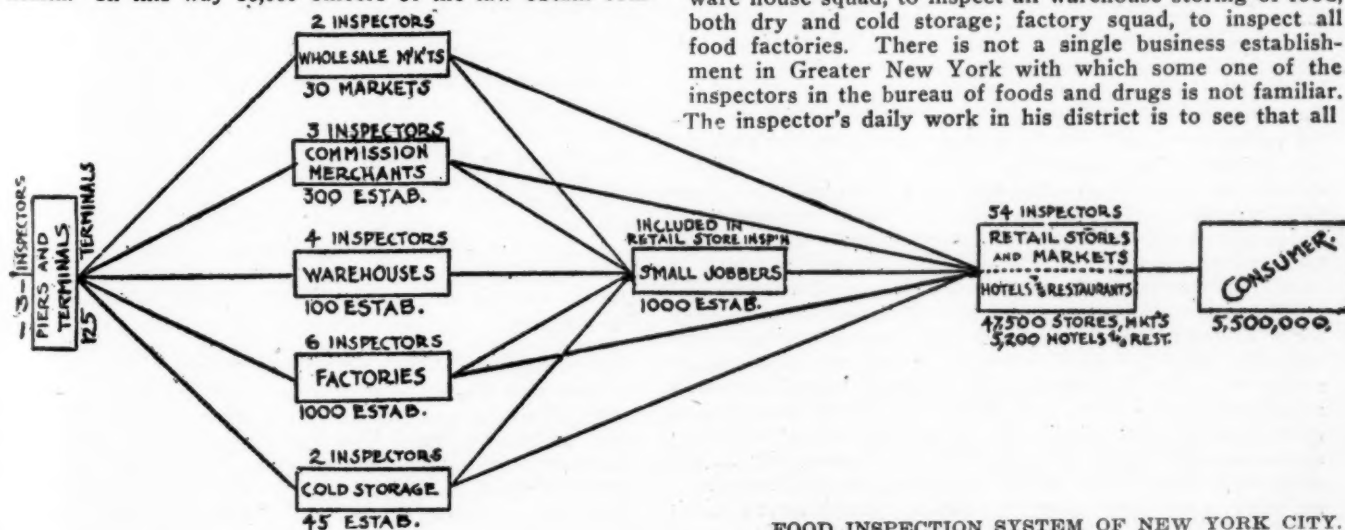
Where the covering is of net the netting must be arranged not to rest upon the food.

The following foods are not required to be covered, for the reason that they are pared, peeled or cooked before consumption: Pineapples, pomegranate, potatoes, onions, kale, spinach, bananas, cucumbers, sweet potatoes, beets, kohlrabi, squash, oranges, cantaloupe, artichokes, cabbage, parsley, dried beans, lemons, watermelon, turnips, cauliflower, parsnips, dried peas, grapefruit, beans, corn, eggplant, peppers and lentils.

There are on duty at all times in the borough of Brooklyn three supervisors, ten food inspectors and five milk inspectors. In Manhattan there are three supervisors, twenty-two food inspectors and four milk inspectors. In addition to these inspectors there is a squad of fifteen inspectors assigned to special duty at terminals and food factories, and they cover all factories and terminals in Brooklyn as well as in the other boroughs. The inspections of food establishments from January 1 to May 1 in the boroughs of Manhattan and Brooklyn indicate the distribution of department services to these two boroughs:

Inspections	Manhattan	Brooklyn
Butcher shop	1,774	1,976
Confectionery	1,558	702
Delicatessen	2,128	2,133
Fish stores	205	242
Groceries	2,929	4,563
Bakeries	2,684	2,306

Lucius P. Brown, director of the bureau of foods and drugs of the health department, has set about to organize his staff for cooperation with the federal authorities in Greater New York for federal food control. Within a few hours after receiving the proper authority from secretary of agriculture Houston, Mr. Brown can send out of his office 400 food sanitation experts, most of whom for several years have been in constant touch with the food trade of the city, to gather statistics on all phases of supply. The bureau was organized in 1914 by combining certain pre-existing divisions in the city government. The whole city was divided into twenty-one districts, each district under a supervisor, who was given a certain number of men to look after all matters relating to food sanitation. After Mr. Brown became head of the bureau, the number of districts was cut to twelve, and finally reduced to eight. Within each district each inspector is given a certain territory to cover. There are likewise certain squads assigned to special work as follows: Terminal squad, to inspect all incoming foods; ware house squad, to inspect all warehouse storing of food, both dry and cold storage; factory squad, to inspect all food factories. There is not a single business establishment in Greater New York with which some one of the inspectors in the bureau of foods and drugs is not familiar. The inspector's daily work in his district is to see that all



FOOD INSPECTION SYSTEM OF NEW YORK CITY.

the legal requirements in sanitation and food purity are met. He submits daily reports on his labors. These reports are on file in the bureau of foods and drugs. They cover all violations of the law. Some years ago, when New York had 4,500,000 population, Dr. Herman Betz, former chief of the division of food inspection, figured from the reports of his staff that New York ate about 4,533,744,375 pounds of food per year. This total was based upon a dietary of forty-four ounces of food per day per individual. New York city's estimated population at present is about 5,600,000, and if the average New Yorker eats as much today as he did when the population was but 4,500,000, this year's food consumption will amount to 5,667,170,467 pounds.

The accompanying diagram shows the main lines of flow of foodstuffs—the secondary lines are through huckster, direct sales to consumer and the like. From the producer the food goes through the hands of the commission man, wholesaler, manufacturer, miller or canner and by railroad to the city line. Here inspection begins and sampling is done at all practicable points as follows:

1. As supply enters city, these points are:
 - A. Piers and Terminals.
 - B. Wholesale Markets.
 - C. Commission Merchants' Houses—All unsound materials discovered are diverted at these establishments.
2. Factories—Here are controlled soundness and adulterations of foods. Sanitary conditions to be controlled here by permits to do business and close inspection.
3. Cold Storage Warehouses and Ordinary Warehouses—Here are controlled materials which have reached this point through channels already named or which reach city directly through warehouses. All unsound materials are diverted here, and sanitary conditions to be controlled by permits and inspection.
4. Small Jobber—Here are diverted unsound foodstuffs reaching this point, unsoundness originating here and sanitary conditions controlled as with last two items.
5. Various classes of retailers are to be controlled by permits to do business issued only after approval of sanitary conditions and methods. Unsound materials found here will probably originate with the establishment.
6. Hotels and Restaurants—Controlled by permits to do business issued only after approval of sanitary conditions and methods, and by inspections for soundness and adulterations of foods.

State Board Orders Abatement of Nuisance.

Fremont, Neb.—Mayor W. C. Wiley has been notified that the state board of health will start suit against the city of Fremont, if steps to relieve the unsanitary condition along the sewer ditch east of the city are not taken. State engineer Johnson with a committee from the council made an inspection of the ditch last fall and engineer Johnson recommended the erection of a septic tank for disposing of Fremont's sewage. The tank complete would cost about \$60,000, it is reported.

WATER SUPPLY

City Loses Meter Fight.

York, Pa.—The state public service commission has made an order directing the York Water company to reduce from nine cents to four cents a cubic yard, its charges for water furnished for mixing concrete for street paving; the commission also filed an order refusing to direct the company to install meters whenever required by consumers in the city of York, or to interfere with rates charged by the company other than for mixing concrete for paving. These are the results of the contest which the city authorities, joined in by Chester H. Thomas and Dr. J. F. Klinedinst, have been conducting against the York Water company to secure a metered service to domestic consumers, instead of the flat rate per spigot which has been in use by the company for over a century. The commission says in part: "It is undoubtedly in line with the modern trend to require water companies to install meters and make charges for the water actually used. In the case before us, however, the people of York are in the enjoyment of a copious supply of water against which no complaint has been made as to purity and clarity, and which they receive in unlimited quantities, pumped, piped, stored and filtered, at a charge as low as that enjoyed in probably any community in the state. To compel the water company to put in meters to all their more than 11,000 customers would be to entail needless expense upon the company which would be re-

flected in increased charges necessarily, and to require them to supply some of their patrons with meters would be to create another class of consumers with the possibility of unjust discrimination."

The opinion states that "the total number of customers of the respondent company is 11,397, of whom only 342 come under the division receiving metered service. Of the 11,055 who are charged flat rates, 5,701 pay \$5 or less for unlimited service; 3,812 pay between \$5 and \$15 for unlimited service; 1,266 of them pay between \$15 and \$22 for unlimited service, and 276 pay various sums from \$9 to \$86.50, one paying the latter amount. The 342 users upon metered service paid during the year 1915 various sums, the lowest being \$2.89, and the highest \$5,981.70.

"In view of the charges made by other water companies in our commonwealth it cannot be asserted with truth that there is any excessive sum collected, or improper amounts demanded from the patrons of the York Water company. The supply given to them is unlimited. The charge therefor, it is true, is based upon the number of water connections or outlets, but such method of charge is not uncommon.

"The complainants assert that such a basis of computation does not meet the requirements of the charter of the company and that the spigots or outlet charge is not the fixing of a rate 'having due regard to the probable quantity of water which applicants are likely to consume.' They aver that the use of a meter is the only method by which the 'probable quantity of water' can be determined, and that these quoted words demand their installation. It is undoubted that when the charter of the York Water company was granted meters were unknown so that these devices could not then have been in the legislative mind, and it seems to the commission that the fixing of a rate for the probable quantity of water which the applicants are likely to consume can be determined with sufficient accuracy under the century-old methods prevailing in the city of York by the number of spigots in a building."

The charge for water for concrete mixing which was in dispute amounted to \$902.62, being for 10,031 cubic yards at nine cents per yard. The commission reduces this bill to \$401.24 and directs that the company hereafter charge the city for such water at the rate of four cents per yard, this new rate to become effective on or before June 15, next. The testimony shows wide variance in the charges in different sections in Pennsylvania, but with ordinary care 35 to 45 gallons of water to one square yard of paving seems to be the amount required. "Giving due consideration to the probability that waste is considerable, we think that the sum of four cents per cubic yard would be adequate, and in accordance with the suggestion made that we fix a fair price for water so used by the city of York, we name four cents per cubic yard as the price that should be paid for that which is now in dispute, and for that which may hereafter be used."

Utilities Commission Has No Power Over Municipal Plant.

Phoenix, Ariz.—The action instituted by D. B. Harrer to enforce the city of Phoenix to supply him, a suburban resident, with water under conditions and rates as those given customers living within the city has been dismissed by judge Pattee of Pima County, who sat in the recent demurrer action. Judge Pattee further ruled that the Arizona corporation commission had no jurisdiction to act in this case, in fact, has no jurisdiction over any municipal corporation. A hearing in this matter was pending before the corporation commission, but the decision handed down by judge Pattee, however, dismisses the entire case, including the action. The corporation commission does not recognize the decision, or, at least, believes that the decision is not in keeping with the corporation laws of the state. It is the contention of the commission that when the water department of the city of Phoenix serves water outside of the corporate limits, it is no longer a municipal corporation and is therefore subject to regulations by the commission. The commission has never claimed the right, it is said, to supervise municipal corporations. A hearing was conducted sometime ago by the commission on this case, a decision being handed down in favor of the complainant, Mr. Harrer. Assistant city attorney J. E. Nelson appeared for the city.

Water Plant Bonds Upheld by Court.

Lawrence, Kan.—After a delay of more than a month, the work of building the new water plant for Lawrence has been again resumed. The supreme court of Kansas decided that the \$250,000 bonds issued by the city to pay for improvements on the plant are valid. The decision was given in the mandamus action brought by S. M. Brewster, attorney general, against the city of Lawrence, asking the

supreme court to order the city to issue the bonds. The court granted the request for mandamus and ordered the bonds issued. The Kansas Construction Company, which holds the main contract, has again taken up the work of grading the site of the new plant, which was suspended when the legality of the bonds came into question. Superintendent E. H. Dunmire believes that with good luck and open fall weather it may be possible to get the plant under cover before cold weather. If this can be done, the plant can be practically completed during the winter. The only thing which threatens delay in the work this summer is the possible difficulty in getting supplies. A supreme court decision was necessary to establish the validity of the original issue of bonds for \$175,000 to purchase the plant. The same firm of bond attorneys in Chicago which questioned the purchase bonds objected to the improvement bonds. Altogether the delays have cost the city a year's time in building the plant, and many thousands of dollars because of advances in the price of materials in that time.

STREET LIGHTING AND POWER

Cleveland's Municipal Heating Plant.

Cleveland, O.—Cleveland's municipal steam heating plant, it is reported, was operated at a loss of \$10,754.44 in 1916, according to a statement for the year made public by the city department of finance. Although the earnings of the plant in 1916 exceeded those of 1915 by \$10,000 the increased cost of fuel and a higher depreciation cost more than offset this gain in business. The earnings last year were \$44,018.11 and the earnings in 1915 were \$34,392. The total cost of operation was \$54,772.55 last year. The plant was operated at a loss of \$333.27 in 1915 and it was hoped that a profit would be shown in 1916. Public utilities director Farrell believes the heating plant should be combined with a municipal ice plant. In his opinion the two utilities operating together would wipe out the loss. The heating plant is operated by the water department.

Gas Plant Purchased by City.

Palo Alto, Cal.—It is expected that within a few weeks the city will formally take over the gas plant of the Palo Alto Gas Company. The citizens recently voted by an overwhelming majority a \$70,000 bond issue for the purpose of purchasing the plant.

Defeat \$2,000,000 Hydro-Electric Development Bonds.

Los Angeles, Cal.—In spite of a good fight by the Municipal League of the city, the proposition to issue \$2,000,000 worth of bonds to finance extension of the power development on the aqueduct was defeated at a special election by a big majority. The measure was, of course, fought by the Los Angeles Gas & Electric Corporation. The rest of the system has been built, including power plant No. 1, a 37,000 h.p. plant selling power at a rate of \$60,000 a month. The proposed plant No. 2 would develop 25,000 h.p. and sell \$50,000 worth of current a month. For this plant \$1,000,000 was to have been spent; \$250,000 was proposed for the construction of the Franklin Canyon power plant and \$750,000 for the development at Owens River Gorge. The water power at these points is now wasted. Before the election the Municipal League had sent a committee consisting of Nelson Rhoades, an engineer, and George H. Dunlop to investigate along the whole length of the aqueduct and this committee urged favorable action on the proposed development.

Natural vs. Artificial Gas Case.

Elmira, N. Y.—After a lengthy three-cornered struggle between the city, the Elmira Water, Light & Railroad Company and the Potter Gas Company, which furnishes the supply of natural gas to the local concern, the public service commission has handed down a decision substantially in favor of the Elmira company. The natural gas supply and service has for a long time been poor and the Elmira company decided to build an artificial gas plant and increase rates. The Potter company objected and claimed it could give a good supply. The public service commission's decision orders that before the proposed gas rates are fixed under the new plan whereby the Elmira company is author-

ized to build a new gas plant the company must give the city authorities and the corporation counsel thirty days' notice of the date when it is proposed to put the new plant in operation. The commission is to fix tentative rates which are to go into effect on or about the date when such new plant is put into operation. Prior to the fixing of these tentative rates the commission must give the authorities of the city an opportunity to present any evidence they may desire relative thereto, and the order of the commission fixing such rates shall provide that they shall remain in force for a period of one year from the date of the order and for such a period thereafter as may be necessary to enable the commission to fix a schedule of maximum rates as set in the order. Promptly after the expiration of the one-year period the commission shall give the parties to this proceeding an opportunity to be heard and to present evidence with respect to such tentative rates; and thereafter the commission shall determine the just and reasonable rates to be charged for gas by the petitioner for a period of not exceeding three years from a date to be fixed by the commission. In the event that the commission shall find, after an investigation, that the tentative rates are unreasonable, and should be reduced, the company shall refund in cash the difference. All such refunds shall bear interest at the rate of six per cent per annum from the date of collection. If the city of Elmira does not wish to present any evidence with respect to the rates after the expiration of the one year, it shall notify the commission to that effect within 20 days from the time fixed by the commission for a hearing. If the city fails to proceed promptly the commission is to make investigation as it may deem proper, and fix the rates.

Municipal Plant to Supply Five Cities.

Valley City, N. D.—A high tension system of electric power will soon serve five North Dakota cities, a new company having been formed for the purpose of supplying not only the cities but also the farmers living in the vicinity. The line will run through Rogers, Daisy, Hannaford and Sanborn, probably also through Wimbledon. It is planned so far that about sixty farmers will be enabled to do some of their work by electricity. The municipal power plant of Valley City will furnish the power.

The Ontario Provincial Hydro-Electric Plant.

Toronto, Ont.—The Ontario Power Company, of Niagara Falls, Ont., has formally announced the sale of its plant to the hydro-electric power commission of the province of Ontario, through John J. Albright, of Buffalo, president of the company. The province will pay \$32,000,000 for 90 per cent of the company's stock. Possession will be transferred August 1. Minority stockholders will be allowed to sell stock on the same terms or they may exchange it for 4 per cent debentures of the hydro-electric commission.

FIRE AND POLICE

Portland Turns Down Two-Platoon System.

Portland, Ore.—At the recent general election the proposition to establish the two-platoon system for firemen was defeated by a vote of 28,497 against 19,452, a majority of 9,045. The plan was to reorganize the fire bureau into two platoons of not more than fourteen hours night duty or ten hours day duty, requiring the council to make appropriation therefor, prohibiting the reduction of salaries and vacation of firemen, and requiring provisions for the health of firemen. Strong opposition developed against the plan following the publication of a report of an investigation by the National Board of Fire Underwriters and the protests of the officers of the department. The underwriters report made the voters feel that the proposed bill was far more than a two-platoon bill and that it proposed to take much of the administration of the fire bureau out of the hands of the chiefs and place the management in the hands of the firemen themselves; that salaries and time off duty and other features are written into the bill. To make the two-platoon proposition effective, these engineers say that to place the fire bureau on as efficient basis under a two-

platoon system as it is at present would necessitate the employment of more than 140 men at an increased cost to the taxpayers of \$171,000 a year. Even this increase would not take care of the fire prevention work, which largely is responsible for the reduction in fire losses in this city during the past year, and additional men would be necessary to handle this work. Fire chief Dowell said that at least 40 men would have to be employed for fire prevention work alone. Fire chief Dowell, first assistant chief Laudenklos, fire marshal Stevens and battalion chiefs Young and Holden were opposed to the bill because, according to their statement, "it will demoralize the department by cutting down the number of men on duty at all times, especially at night; it may close up some of the fire houses; it will increase the payrolls far beyond the amount which can be raised by the city under the 6 per cent tax limitation and make it impossible to get appropriations to keep up the equipment of the fire bureau; it will demoralize discipline because it places details of management in the hands of the firemen and takes away the fixing of direct responsibility from the mayor and city commissioners and the fire chiefs. This bill fixes the salaries of firemen and takes from the city authorities the right to change them. It is not right that firemen should be exempt from this control while every other city employe is subject to it. The proposed bill is so different from other two-platoon bills submitted to the people in other cities that the plan adopted elsewhere is no guide for the action of any Portland citizen."

Many Dead and Injured in Sugar Factory Fire.

New York, N. Y.—Four persons lost their lives in an explosion and fire which destroyed the nine-story building of the American Sugar Refinery Company, Williamsburg. Two or three of the thirteen injured in hospitals may die. While the damage done by the fire will pass the million mark, it will not appreciably affect the sugar supply, according to officials of the company. Fire marshal Brophy said the blaze was probably caused by spontaneous combustion and not by bombs or incendiaries. The fire, which followed a terrific explosion, was a very difficult one to fight and it was fortunate that it did not occur in the daytime when hundreds of girls are usually at work. Apparatus was called from the whole lower end of Manhattan to Brooklyn and almost every company in Manhattan had to move to "cover up" the ones called. The first company on the scene had a narrow escape from a falling wall. All the families in the surrounding tenements, mostly foreigners, were ordered out of their houses and assembled in the nearby park under the guardianship of police and soldiers. When rain began they were put in tents. The fireboats New Yorker, William J. Gaynor and Seth Low fought the blaze from the water-side.

Two Engines Abandoned in Difficult Fire.

Boston, Mass.—The accompanying illustrations show two scenes at a very troublesome blaze which recently occurred in South Boston. Because of a stiff northwest wind, which drove the embers for long distance, innumerable small roof and piazza fires gave the department a hard fight. Three buildings were burnt. The fire started in a rubber factory and there were 134 horses in the stable. All were rescued. Two engines were damaged—one by a falling wall and the other by a sudden burst of flame. A tenement area of wooden buildings were menaced by the blaze. Two firemen were overcome. The fire alarms brought out 21 engine companies, five ladder companies, two water towers and many chemical engines and fuel wagons. Two fireboats gave powerful assistance. Almost the entire department was shifted and in "covering" the houses were helped by Newton, Watertown, Cambridge, Brookline and other places. The illustrations show Engine 7 after the wall fell and a view of the fire from a high building. In the foreground can be seen a number of boats damaged by the fire.

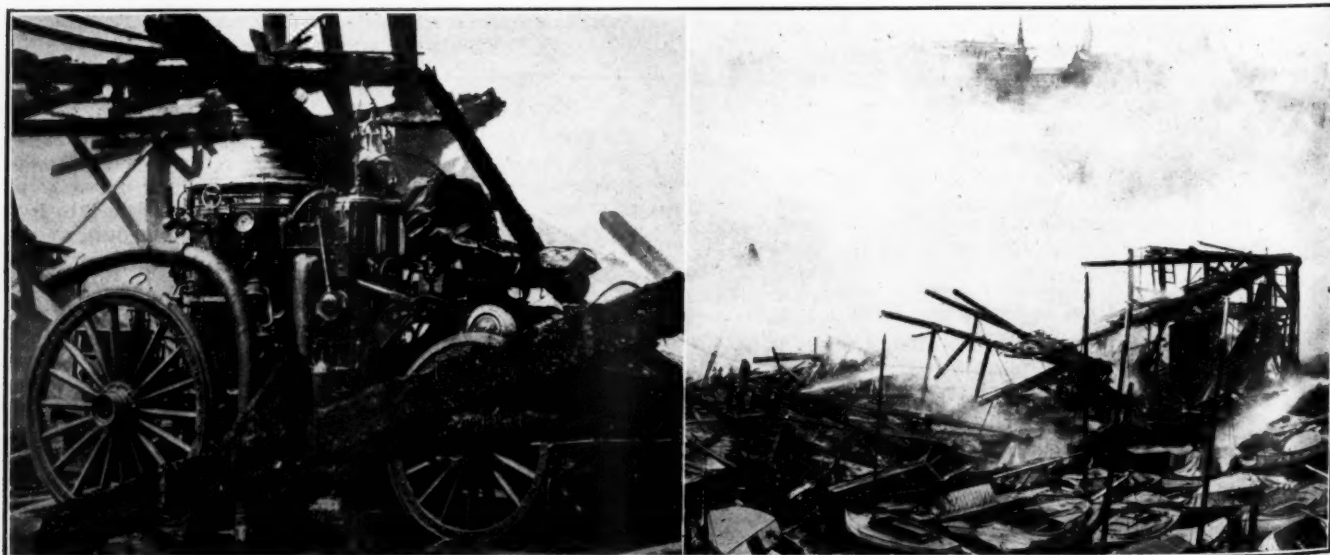
GOVERNMENT AND FINANCE

No Central Purchasing for New York City.

Albany, N. Y.—Governor Whitman has vetoed Assemblyman Simpson's bill authorizing the Board of Estimate and Apportionment of the city of New York to establish a central department of purchase, at the head of which shall be the members of such board. The bill, in spite of features to which he objected, had been approved by Mayor Mitchel. "After this bill was approved by the mayor," says Governor Whitman in his veto memorandum, "the president of the Borough of Queens, at a meeting of the Board of Estimate and Apportionment, offered a resolution to the effect that the board request the Governor not to approve the bill. The resolution failed of passage by a vote of eight to eight. The acting president of the Borough of Brooklyn voted 'No,' but since that time I have received a letter from him requesting that I veto the bill, thus six out of eight members of such board are opposed to this measure and two are recorded in its favor." A central purchasing plan has already been in operation in the city administration for some time, but its activities have been confined to those bureaus under the direct jurisdiction of the mayor.

Inaugurate Inter-County Conferences.

Newark, N. J.—Plans for a monthly conference of freeholders representing Essex, Hudson, Bergen and Passaic counties have been formulated at a meeting in Hackensack of the tri-county bridge committee, comprising members of the Essex, Hudson and Bergen boards. It was the first



Courtesy, Boston (Mass.) Evening Transcript.

SCENES AT RECENT SOUTH BOSTON FIRE.

meeting of the tri-county committee in Bergen County in five years. Provided the Passaic County Board of Freeholders, which has hitherto never been represented on the inter-county committees, acquiesces, the monthly sessions will be more than meetings of the various bridge committees. The sessions will be held in rotation in the four counties, and each time at a different institution in the various counties. Thus, it was agreed, the freeholders of Bergen, Hudson and Passaic will become acquainted with Essex County institutions and executive methods and the freeholders of this county will learn of methods in other counties. Technically, Passaic County will be brought into the conference through the formation of a Bergen-Passaic bridge committee. The conference, thus, would be the addition of the session of this projected bridge committee to the sessions of the tri-county, the Bergen-Hudson, the Essex-Hudson and the Essex-Bergen bridge committees' meetings. These four sessions have usually been held consecutively at the one place and hour, so as to save time. Heretofore, most of the meetings have been held in this county. At the regular tri-county meeting, action by the Hudson County freeholders in recommending, subject to the concurrence of Essex and Bergen counties, a general 15 per cent wage increase for bridge employees was met by a compromise agreement on 10 per cent. The tri-county committee's action extended only to the Belleville Bridge employees. At the following session of the Hudson-Essex committee, a similar compromise, reducing the Hudson recommendations from 15 to 10 per cent for all other bridges, was effected. About sixty workers, the majority of them receiving less than \$1,200 yearly, were affected. The total cost will be divided among the counties on the established pro rata percentage basis now in effect. In all, about five-eighths of the cost will fall on this county.

Portland Keeps Commission Form.

Portland, Ore.—In addition to voting on a number of state and other city measures the citizens turned down the proposition to change the city charter so as to eliminate the commission form features. The vote on the proposition was 32,398 against 12,617, a majority against of 19,777. The amendment was worded as follows: "Charter amendment proposing a new form of city government; repealing commission form; vesting all legislative powers in council composed of eleven members; dividing city into eleven districts with one representative, called district commissioner, to be elected to the council from each district; providing for election of mayor and auditor, for appointment of city attorney, city engineer, municipal judge and purchasing agent; vesting all executive powers in executive board composed of mayor, city attorney and city engineer; prescribing powers of civil service board." Another amendment, defeated by a vote of 31,859 against 14,630, read: "An amendment to the city charter abolishing commission form of government, establishing eleven wards, providing for election of a mayor, auditor, treasurer, municipal judge and a councilman from each ward, giving the mayor veto power, granting all legislative powers to eleven councilmen, and providing that the executive and administrative functions be performed by the mayor and an executive board consisting of the mayor, city engineer and city attorney." At the same election, the voters favored the bonding and regulation of the jitneys and the issuing of \$3,000,000 bonds to build a municipal grain elevator. The proposition to issue \$75,000 bonds for a garbage collection system was defeated, while a tax of four-tenths of a mill for parks and playgrounds was approved.

MISCELLANEOUS

Controversial Housing Legislation Signed.

New York, N. Y.—Governor Whitman has signed the three-family tenement house bill. In announcing his approval of the measure, the governor said: "By increasing the number of tenement houses of proper design and equipment in the city of New York the supply will be increased in proportion to the demand, and rents will be accordingly reduced." The bill amends the tenement house law so as to encourage the erection of three-family tenement houses.

Such constructions and alterations, it is thought, will tend to check congestion in the city of New York and will provide safe and sanitary accommodations at rentals which people in needy or moderate circumstances can afford to pay. "Experience has shown," says Governor Whitman in the course of his memorandum, "that on account of the restrictions contained in the tenement house law there is no incentive for constructing a tenement house for three families only. A new tenement house, ordinarily, is at least six stories high and houses a number of families on each floor. Relief from such conditions by any means which properly conserve the health and safety of tenants is highly desirable. At present many former private residences are used as boarding houses and more people are housed therein than would naturally be the case if the buildings were three-family tenement houses. These boarding houses are not now subject to the jurisdiction of the tenement house commission nor to the provisions of the tenement house law. It seems to me that such private residences are not equipped with as many safeguards as they would be under the proposed act." It is felt by many housing reformers and civic workers, who fought the legislation, that the bill is very dangerous and will prove an entering wedge for the breaking down of the whole Tenement House law, which has been the object of all kinds of attacks by reactionary real-estate interests. The bill allows the conversion of the dwellings without requiring them to conform to many safeguarding provisions of the law. The pioneer in housing legislation in New York, the man who developed the code and helped bring it to its present strength, Lawrence Veiller, secretary of the National Housing Association, has resigned from the directorship of the tenement house committee of the Charity Organization Society because of this bill, which the committee approved. Mr. Veiller had been connected with the committee for nineteen years.

Charge Coal Operators With Extortion.

Indianapolis, Ind.—After a thorough investigation in one hundred towns and cities in all parts of the state, the public service commission has reported on the coal situation and a conference has been held between the leading coal operators and the governor. Some sort of agreement for improving deliveries and reducing prices will probably be the outcome, following a threat by the governor of drastic action and Federal legal proceedings. The commission's report was vigorous in its condemnation of the operators. "The actual powers of this commission are limited and well defined in the statutes. By the old railroad commission act, the shippers' bill, and by other legislation, are conferred very drastic powers which it may exercise on the coal transporting common carriers, but, as will be explained later, there seems at this time no need to resort to those steps. On the other hand, there is conferred on this commission no regulatory powers over mines or over the prices at which any commodities shall be sold. In our hearings held, first, with the Indiana coal operators, and, second, with coal consumers and local dealers all over the state, was established a fundamental and basic fact that deserves being emphasized here—that coal is the greatest of our necessities. It is not even outranked as a necessity by foodstuffs. Without coal, foodstuffs can not be distributed or conserved, either by process of icing or cooking. A few factories have been shut down already. Last winter revealed the social effect of a deficient coal supply when the state itself was confronted with the fear that unfortunate insane in one or more of the great state hospitals would be left without heat in zero weather; and Purdue university was within six hours of being closed by lack of fuel. Many cities and towns have, for like reasons, though perhaps unknown to themselves, been within a day of their electric light and power, water supply and fire protection being shut off through empty coal bins at the public service plants. Our investigation has left no shadow of doubt in the mind of a single one of the five members of this commission that in this critical period prices for this necessity have been advanced to a point that we can not designate other than outrageous. Our state-wide investigation reveals that Indiana coals have been advanced in this state from 100 to as high as 400 per

cent during the last half year. The domestic consumers, a large army of whom are on low wage or salary that has not materially advanced, and a considerable number of whom can only buy in small amounts, or even 100-pound deliveries, as needed, are having to pay double or more than double the prices ordinarily charged for this vital necessity. Manufacturers generating their own power and public utilities under the necessity of supplying power to industries, and under more vital obligation of supplying water, light, gas and other such services to communities, have been confronted with advances up to 400 per cent in times when it was known they were in severe straits to fulfill their obligations. The situation, already serious, will become much worse unless the present coal control methods are changed. The testimony, both in direct admissions and by its universal trend, reveals that an unchecked "law of supply and demand" is the only law now known in the coal supply in this state, and that it is being administered with concerted action on the basis of charging all the traffic will bear. The operation of this law is, in war times such as this, always in the hands of the few who control the supply at the mines and its local distribution. Its operation has become especially vicious and inimical and dangerous to public welfare under such conditions as the war has produced in Indiana. While many coal mine operators and contractors are living up to contracts to supply coal, many others have disregarded such contracts. Evidence produced in the state-wide inquiry indicates that some operators and contractors have reported to people or firms with whom they had contracts that they could not deliver coal to them because of inability to get coal cars, but have, at the same time, sold coal of the same kind and given prompt delivery to those who paid the high prices demanded in the open market. The operators, contractors and jobbers have lately adopted a fixed policy of "making no contracts" with any except railroads. This leaves their coal to sell on the high open market.

In our hearing, at which the operators appeared, these two facts were established: (1) that there is plenty of coal in Indiana to be mined; (2) that there is labor available to mine it. The operators testified that possibly as many as twenty-five new big mines are being opened now in this state. They insisted that, at the time of the hearing, they were unable, and had been unable, to get coal cars to load more than 50 per cent of the time. Under conditions of mining in Indiana the lack of cars at the mines results in the mines themselves being shut down. This condition, as a result of our conference with the railroad managers, is being rapidly changed. We are pleased to report that the response to our invitation by all the carriers of the state was hearty and cordial. We expect through these coordinating agencies to be able to prevent the movement of motive power and cars from this district, to which we think it is entitled, to other districts; we expect to be able to expedite the movement, at concentration and interchange points, of cars loaded with coal or returning empty and to shorten some routes of movement and to divert, from a carrier to some other carrier, traffic which it is not able to handle, when its business is congested. The state-wide investigation developed beyond all controversy, against the assertion that the mines were being kept closed down most or part of the time because of lack of coal cars in which to load and move the coal, the fact that coal was always to be had, and on quick delivery, if the prices demanded were paid. In our hearing at which the operators appeared these two further essential points were made of record: (1) Officers of the operators' association, and operators themselves, asserted that the average cost of mining coal in Indiana at this time is \$1.48 a ton. This, they testified, includes the recent advance in wages granted to the miners and all other expenses, including reasonable depletion, depreciation, liabilities, capital charges, etc.; (2) the railroad companies have made contracts with certain Indiana operators, located on their several lines, for coal at \$1.90 to \$2.10 a ton; the railroads, however, to furnish full working time supply of coal cars. The operators evaded answering, or denied ability to answer, all questions as to what would be a fair profit a ton for them, over and above all expenses, which

are covered by the \$1.48. It is difficult on any basis of justice or reasoning to reconcile with these figures the \$2.50, \$2.75, \$3, \$3.50, \$3.75 prices that have been charged at the mines for coals inferior to those that the railroads demand for their locomotives, to say nothing of the \$4 to \$5 prices that have been charged public utilities, manufacturers and others who were in dire distress."

Zoning in New Jersey Cities.

Trenton, N. J.—Local civic bodies in the first-class municipalities in the state are preparing to take advantage of the recently enacted zoning law (House bill 129) which permits cities to appoint commissions on building districts. The functions of these bodies will be, after careful study, to divide the city into the proper zones within which the height, bulk, class and use of buildings will be regulated and restricted so that the public safety, health and welfare are promoted and realty values conserved. The power to zone the cities is granted under the general police powers of the cities. The commission in each city is to consist of the chief engineer of the body controlling streets and highways, the superintendent of buildings, the officer in charge of inspection of combustibles and fire risks, the president of the board of assessment and tax revision, four members of the city plan commission and three members at large. Newark, of which the city plan commission, under secretary Arthur B. Cozzens, has been a leading factor in the fight for the legislation, has already appointed such a commission.

Organized to Build Army Cities.

Washington, D. C.—Engineering experts of national prominence are to assist the United States Government in planning and building the thirty-two cities which are to house between 20,000 and 30,000 men each who are to form the conscript army. These cantonments are to be of substantial construction and are to be served by roads, sanitary improvements, water supply, sewerage, lighting, heating and transportation facilities. The Engineer Corps, in this big task, is to be helped by a number of experts who have volunteered their "supplementary, not substitutional," services without compensation. The group includes engineers, contractors and city planners, and among these the following have been called into consultation: Leonard Metcalf, consulting engineer, Boston; George W. Fuller, consulting engineer, New York; E. P. Goodrich, city planning engineer, New York; Nicholas Hill, consulting engineer, New York; R. W. Hunt, consulting engineer, New York; Otis W. Post, architect, New York; John Ihlder, housing expert and city planner, New York; George B. Ford, city planner, New York; Charles Butler, hospital architect, New York; E. F. Stevens, hospital architect, Boston; G. A. Reeder, architect, New York, and A. E. Phillips, superintendent of sewers, Washington, D. C. H. B. Eaton, of the du Pont company, is to prepare an organization chart and to advise on quantities of costs of materials. Howard L. Rogers, of the Stone & Webster Corporation, assisted in organizing the group of volunteer experts.

Civic Center Plans Held Up by Litigation.

Baltimore, Md.—Judge Bond, sitting in the city court, has ruled that the ordinance on which the city based its condemnation proceedings against certain property on the proposed civic center site is not within its rights when it gives the Board of Estimates condemnation powers. In giving his ruling, judge Bond sustained the demurrer of the complaints to the city's condemnation proceedings and by so doing held up, temporarily, the plans of Baltimore for the civic center. Judge Bond, in his decision, states that the "court cannot ignore the fact that the various municipal boards and agencies have clearly defined functions and that these cannot be shifted. A board or agency cannot be used for new and entirely different purposes and if it does it violates the charter." The plaintiffs are among those property owners in the proposed civic center section who are making preparations to fight the municipality and keep their property. The demurrer attacked the first ordinance approved by the city council on February 16, 1915. It provided for the condemnation of land as outlined by the report of the Municipal Art Society in 1910.

NEWS OF THE SOCIETIES

Calendar of Meetings.

June 20-22.—LEAGUE OF TEXAS MUNICIPALITIES and TEXAS TOWN & CITY PLANNING ASSOCIATION. Joint Convention, Dallas, Tex.

June 20-22.—PENNSYLVANIA STATE CHIEFS OF POLICE ASSOCIATION. Fourth annual convention, Hotel Adelphia, Philadelphia, Pa.

June 20-22.—AMERICAN INSTITUTE OF CHEMICAL ENGINEERS. Semi-annual meeting, Buffalo, N. Y. Secretary, J. C. Olsen, Cooper Union, New York, N. Y.

June 25-27.—LEAGUE OF LOUISIANA MUNICIPALITIES. Annual convention, New Iberia, La. Secretary, Mayor Joseph B. Elam, Mansfield, La.

June 28-30.—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting, Atlantic City, N. J.

July 10-12.—MUNICIPAL LEAGUE OF INDIANA. Annual convention, Shelbyville, Ind. Secretary, W. S. Jones, City Clerk, Shelbyville.

July 12, 13.—LEAGUE OF MICHIGAN MUNICIPALITIES. Annual convention, Grand Rapids, Mich. Secretary, Charles A. Sink, Ann Arbor, Mich.

July 24-27.—DOMINION ASSOCIATION OF FIRE CHIEFS. Annual convention, Port Arthur and Fort William, Ont. Secretary, James Armstrong, Chief, Fire Department, Kingston, Ont.

July 30-Aug. 3.—SOUTHERN SOCIOLOGICAL CONGRESS. Annual meeting, Blue Ridge, N. C. Secretary, J. E. McCulloch, 508 McLachlen Bldg., Washington, D. C.

Aug. 1-3.—AMERICAN SOCIETY OF SANITARY ENGINEERING. Annual meeting, Grand Rapids, Mich. President, William C. Groeninger, Ohio State Board of Health, Columbus, O.

Aug. 6.—PACIFIC COAST ASSOCIATION OF FIRE CHIEFS. Twenty-fifth convention, Anaconda, Mont. Secretary, ex-Chief H. W. Bringhurst, Seattle, Wash.

Aug. 15-17.—LEAGUE OF WISCONSIN MUNICIPALITIES. Annual convention, Racine, Wis. Secretary, Ford H. MacGregor, Madison, Wis.

Aug. 21-23.—NEW YORK STATE FIREMEN'S CONVENTION, Flushing, N. Y. Secretary, Thos. Honohan, Frankfort, N. Y.

Aug. 22.—UNION OF NEW BRUNSWICK MUNICIPALITIES. Annual convention, St. John, N. B. Secretary, James King Kelley, St. John.

Aug. 27-29.—UNION OF CANADIAN MUNICIPALITIES. Annual convention, London, Ont. Secretary, W. D. Lighthall, K.C., Westmount, Que.

Sept. 11-13.—AMERICAN ASSOCIATION OF PARK SUPERINTENDENTS. Annual convention, St. Louis, Mo. Secretary, Roland W. Cotterill, 533 City Hall, Seattle, Wash.

Sept. 11-14.—NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention, Hartford, Conn. Secretary, Willard Kent, 715 Tremont Temple, Boston, Mass.

Sept. 27-29.—AMERICAN AND CANADIAN ENGINEERS AND ARCHITECTS OF NORWEGIAN BIRTH OR DESCENT. Informal congress and re-union, Chicago Norske Klub, Chicago, Ill. Chairman, Committee on Arrangements, Joachim G. Glaver, consulting engineer, Chicago, Ill.

Oct. 17-18.—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

Nov. 12-16.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary,

Charles C. Brown, 469 Transportation Building, Chicago, Ill.

Nov. 21-24.—NATIONAL MUNICIPAL LEAGUE. Twenty-third annual meeting, Hotel Statler, Detroit, Mich. Secretary, Clinton Rogers Woodruff, 703 North American Bldg., Philadelphia, Pa.

Nov. 20-23.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Recreation Congress, Milwaukee, Wis. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

American Institute of Electrical Engineers.

As announced previously, the board of directors of the American Institute of Electrical Engineers voted at its last meeting to hold a special institute meeting in New York on June 27 and 28, for the presentation and discussion of papers that were to have been presented at the annual convention, which has been canceled.

The meetings and papers committee has arranged for five technical sessions, which will be in the morning and afternoon of each day and on Wednesday evening.

The monthly meeting of the board of directors will be held Wednesday afternoon at 4.30 o'clock. The program is as follows:

Wednesday, June 27, 10.30 A. M.

Subject, "High-Tension Cables."—"Problems in Operation and Maintenance of Underground Cables," by John L. Harper; "High-Tension Cable Joints," by D. W. Roper; "The Influence of Dielectric Losses on the Rating of High-Tension Underground Cables," by A. F. Bang and H. C. Louis; "Insulation Characteristics of High-Voltage Cables," by W. S. Clark and G. B. Shanklin.

Wednesday, June 27, 2 P. M.

Subject, "High-Tension Insulators."—"The Insulator Situation," by W. D. Peaslee; "Expansion Effects as a Cause of Deterioration in Suspension-Type Insulators," by J. A. Brundige; "Present Practice in Design and Manufacture of High-Tension Insulators," by A. O. Austin.

4.30 p. m.—Monthly meeting of the board of directors.

Wednesday, June 27, 8.30 P. M.

President's annual address. Introduction of President-elect E. W. Rice, Jr.

Reports of technical committees.

Thursday, June 28, 10.30 A. M.

Subject, "Mining."—"Forms of Power Best Suited for Various Loads Encountered in the Operation of Bituminous Coal Mines," by R. L. Kingsland; "Test of a Large Mine Hoist," by R. S. Sage.

Thursday, June 28, 2 P. M.

Subject, "Water Power and Heating of Electrical Machinery."—"Economic Combination of Water Power and Steam Plants and a Convenient Method of Solution," by H. S. Putnam; "Cooling of Oil-Immersed Transformer Windings After Shutdown," by V. M. Montsinger.

American Automobile Association.

Calling for the acceleration and not the cessation of road building because of war conditions, the American Automobile Association in its annual meeting in Washington also urged the construction of a marginal highway around the entire country, with the first section extending from Calais, Maine, to the head of the Chesapeake Bay.

Dr. H. M. Rowe, of Maryland, was continued in the A. A. A. presidential office and Secretary John N. Brooks, of Connecticut, and Treasurer H. A. Bonnell, of New Jersey, succeeded themselves, the latter in his tenth year as the custodian of the funds. Executive Chairman A. G. Batchelder was also re-elected, this time to a four-year term. These vice-presidents were renamed: Ralph W. Smith, Colorado; H. J. Clark, Minnesota; P. J. Walker, California; David Jameson, Pennsylvania; Preston Belvin, Virginia, and Royal R. Scott, Ohio, and J. E. Gavin, Indiana, figured as the newcomers to the list. Former Presidents Robert P. Hooper, of Pennsylvania, and Laurens Enos, of New York, were among the delegates present from twenty different states.

Though a half dozen cities sought the yearly meeting, the directors considered Washington as the logical place for the next gathering.

Dominion Association of Fire Chiefs.

The annual convention will this year be held on July 24, 25, 26, 27th, in the cities of Port Arthur and Fort William, Ont., opening at 9 a. m. in the council chamber, Port Arthur.

The following are the topics arranged for and the speakers who will address the convention:

Fire Alarm Telegraph Systems, their installation, care and efficiency, and their development from gravity cells to storage battery, by F. A. Cambridge, city electrician, Winnipeg, Manitoba.

Volunteer Fire Brigades, their value and service to municipalities, by Chief W. Senn, Eganville, Ont., and A. Z. Couture, Sherbrooke, Que.

Fire Protection and Prevention, in hospitals, public and private, by John E. Keyes, chief fire dept., Galt, Ont.

Wire Glass, its advantage as a fire protection, and its disadvantages to the work of fire departments when called to fires in buildings in which it is installed, by W. J. Smith, chief fire dept., Toronto, Ont.

Illustrated address on the fire at the plant of the Quaker Oats Co. at Peterborough, Ont., by E. P. Heaton, fire marshal for Ontario.

Inspection of buildings by members of the Uniformed Force of Fire Departments, by Thomas Davis, chief fire dept., Victoria, B. C.

The High Pressure System, by J. E. Buchanan, chief fire dept., Winnipeg, Manitoba.

The Committee on Fire Prevention which presented such a good report last year has been enlarged and will have a further report to give to the convention on this important subject.

Question box and round table discussion, Thursday evening.

Reduced rates on the standard certificate plan have been granted for the convention, as follows: If there are more than 300 persons present who have paid single fare of 50 cents or more there will be a free return; if less than 300 and more than 100 there will be return rate of one-third single fare, and if less than 100 the regular two-third single fare will be charged for the return trip. In every case a standard certificate must be secured from the ticket agent or agents from whom you purchase your single fare ticket on the going trip. A certificate fee of 25 cents will be charged by the railroad agent at the convention, and in the event of the number of certifi-

cates being less than 100 this fee will be paid by the association. No reduced return rate will be allowed unless a certificate is presented.

The president has announced the following committees:

On Fire Prevention—Chief Joseph Tremblay (chairman), Montreal, Que.; Chief H. C. Rutter, Fredericton, N. B.; Chief D. J. Lewis, Brantford, Ont.; Chief George Blake, St. John, N. B.; Chief J. M. Melhuish, Brandon, Man.; Chief R. McLeod, Port Arthur, Ont.; E. P. Heaton, provincial fire marshal of Ontario; P. J. Jobin, provincial fire commissioner of Quebec; A. E. Fisher, provincial fire commissioner for Saskatchewan; T. B. Molloy, asst. supt. of insurance for Manitoba.

Exhibits—Chief J. S. France (chair-

man), Bain Wagon Works, Woodstock, Ont.; Chief A. Debeau, Verdun, Que.; Chief J. H. Carlisle, Vancouver, B. C.; Chief W. J. Smith, Toronto, Ont.; Chief T. H. Fitzpatrick, Chatham, N. B.; Chief N. Roberts, Lachine, Que.

Legislation—Chief W. A. Howard (chairman), Peterborough, Ont.; Chief A. B. Ten Eyck, Hamilton, Ont.; Chief J. E. Keyes, Galt, Ont.; Chief W. J. Smith, Toronto, Ont.

Ohio Electric Light Association.

The executive committee of the Ohio Electric Light Association, at a meeting in Cleveland on June 1, decided be-

(Continued on page 838.)

PERSONALS

Bishop, W. P., has been appointed chief of the San Antonio, Tex., fire department.

Campbell, Robert T., has been elected city engineer of Brainerd, Minn.

Flink, Fred, has been appointed village engineer of Nashwauk, Minn.

Gardner, Thomas V., has been appointed chief of police for Steelton, Pa.

Johnson, C. E., was recently appointed city engineer of San Bernardino, Cal.

Lorraine, G. M., has been appointed city engineer of Orland, Cal.

W. G. Mackendrick, president Warren Bituminous Paving Co., of Toronto, Ont., who has been in France the past two years building roads at the front, first as captain in Canadian Corps of Engineers, later as deputy assistant director of roads, with charge of all roads in connection with the operation of the 5th British Army in France as major, has now been given rank of lt.-colonel with the same duties as before. Col. Mackendrick now has 12,000 men operating under him and the splendid results on the repairing of roads, particularly during the German retreat, is largely due to his executive ability and long experience in road construction.

Riddle, H. S., has been appointed by Governor Cox of Ohio, as a member of the State Board of Administration for an unexpired term ending February 1, 1920. The position pays \$4,000 per year.

Schneider, John A., has been appointed water commissioner of the Lakeville-Manhasset district, Manhasset, L. I.

Tobish, Theodore, has been appointed township engineer for Hamilton township, New Jersey.

Upham, Charles M., formerly chief engineer of the DuPont Road and later county engineer of Sussex County, Del., was recently appointed chief engineer of the newly formed Delaware State Highway Commission. G. W. Francis has been appointed secretary to the commission.

Whitaker, R. W., has been appointed city engineer of Bakersfield, Cal.

Willets, G. D., is now city engineer of Galveston, Tex., succeeding A. J. Dickey.

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Hillsboro, Wis., is to construct SEWERS. The engineer is W. G. Kirchoffer, Madison, Wis.

Fayetteville, Tenn., is to construct SEWERS. The engineer for the work is Walter G. Kirkpatrick, 704 Farley building, Birmingham, Ala.

WATER and SEWERAGE SYSTEMS are to be built by Niagara, Wis. Plans are to be prepared by W. S. Shields, 8 South Dearborn street, Chicago, Ill.

Texarkana, Tex., and Ark., are to build a new SEWAGE DISPOSAL PLANT, and have retained to plan and supervise the work engineer Peden, Houston, Tex.

Hamilton, O., is to have its three municipal UTILITY PLANTS, electric light, water and gas, investigated by Mead & Seastone, consulting engineers, Madison, Wis.

Rush Springs, Okla., has met \$30,000 bonds for the construction of WATERWORKS, and \$25,000 for SEWERS. The engineers are the Mackintosh-Walton Co., 1023-24 State National Bank building, Oklahoma City, Okla.

Johnstown, Pa., is to build a new REINFORCED CONCRETE BRIDGE. The plans and specifications are to be prepared by the Hughes Engineering Co., 925 N. Broadway, Dayton, O.

A WATER softening and filtration plant is to be constructed by Hamilton county, at St. Bernard, O. The engineer is E. Kay, 1322 McMillan Ave., Cincinnati, O.

Ankeny, Ia., is soon to construct SEWERS and a DISPOSAL PLANT. The engineer for the proposed improvements is Lawrence W. Cox, 1316 East 12th street, Des Moines, Ia.

The SEWER SYSTEM of the village of Chateaugay, N. Y., has become inadequate to meet present requirements and is to be redesigned. The village has retained as consulting engineer, H. J. Langlois, city engineer of Plattsburg, N. Y.

STREET IMPROVEMENTS are to be made by Clinton, N. C., the engineer being Wm. M. Piatt, Durham, N. C.

STREET IMPROVEMENTS are to be made by Quincy, Fla. Plans are being prepared by the J. B. McCrary Co., Third National Bank building, Atlanta, Ga.

Johnstown, N. Y., is to build a RESERVOIR. The consulting engineer for the improvement is J. P. Wells, 344 Cutler building, Rochester, N. Y.

Caldwell, Kan., is constructing an ELECTRIC PLANT. The plans and specifications were prepared by Burns & McDonnell, Interstate building, Kansas City, Mo.

Uhrichsville, O., is to build SEWERS and a DISPOSAL PLANT. The plans are being completed by the engineer, Geo. Arnold, 114 S. Broadway, New Philadelphia, O.

Elgin, Ill., is to construct a BRIDGE. C. H. P. Turner, 627 First Ave., Minneapolis, Minn., has been selected as engineer to prepare plans and specifications.

Salem, Ill., is to extend its WATER SUPPLY SYSTEM. The plans for the improvement are to be prepared by the Coldwell Engineering Company, Ayers building, Jacksonville, Ill.

Improvements to its WATERWORKS are to be made by Pointe Claire, Que. Plans and specifications for the work were prepared by R. S. & W. S. Lea, 809 New Birks building, Montreal.

Macon county, Oglethorpe, Ga., are beginning the building of a series of CONCRETE BRIDGES to cost a total of \$100,000. The consulting engineer for the work is Arthur Pew, 500 Forsyth Theater building, Atlanta, Ga.

Downington, Pa., is to build WATERWORKS to include reservoir, dam and filtration plant. H. W. Hatton, 708-9 Equitable building, Wilmington, Del., has been retained as consulting hydraulic engineer.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

WATER LEVEL RECORDERS

Long Distance Recorders and Indicators Operate Over Telephone Lines.

For city water works, power plants, pumping stations, there is a growing demand for a device to record or indicate in some central station the water levels at remote reservoirs or streams. Such devices have heretofore been in many plants almost prohibitive on account of the cost of special line wiring.

Stevens long distance water stage recorders and indicators have lately been improved to operate over any existing telephone line without interference to either service. The sender is placed over the water and the recorder is installed in the office or central station. An indicator suitable for switchboard installation may be substituted for the recorder. The device is operated electrically on the open circuit principle, ordinary dry cells furnishing sufficient current for the purpose.

The sender makes an electrical contact every time the water surface changes a given amount. Instruments are made with contact intervals of 0.10, 0.05, 0.02 and 0.01 feet, depending on the accuracy required. For a rising stage the current traverses the circuit in one direction and is reversed for a falling stage. The sender operates a polarized relay that in turn is connected through a station battery to a pair of solenoids, which cause the recorder pen or the indicator hands to follow step by step the fluctuations of the water service.

Only one wire is required, and over a metallic telephone line the two wires are joined by means of suitable repeating coils to form one side of the circuit, thus reducing the line resistance.

Where two reservoirs are to be recorded at the same central station, duplex recorders and indicators are

made to reduce instrument cost. Over a telephone line each is used to operate one side of the duplex.

These instruments are now in successful operation over lines up to 35



GAS MASK FOR FIREMEN.

miles in length, but it is claimed that they can be operated over any distance telegraph messages can be transmitted.

The Stevens long distance water stage recorders and indicators, one of which is shown in the accompanying illustration, are manufactured and sold by Leupold, Voelpel & Co., 107 E. 70th St., N. Portland, Ore.

GAS MASK

For Firemen's Protection.

The gas mask of the European trenches is being copied for peaceful purposes in this country. A mask, or helmet, similar to those used by the soldiers, is now in wide use by firemen and others who have to come into smoke- or fume-filled rooms.

Many of the helmets are high in price, but the Chicago mask is serviceable and claimed to be much cheaper than the usual types. The helmet will hold about 45 cubic feet, or a sufficient quantity of air to sustain a person from

five to eight minutes. The mask is shaken or swung three or four times and quickly pulled over the head. It fits snugly around the neck so that no fumes can enter.

This mask, which is shown in the accompanying illustration, is made by the Chicago Eye Shield Company, 2300-2304 Warran avenue, Chicago, Ill.

INDUSTRIAL NEWS

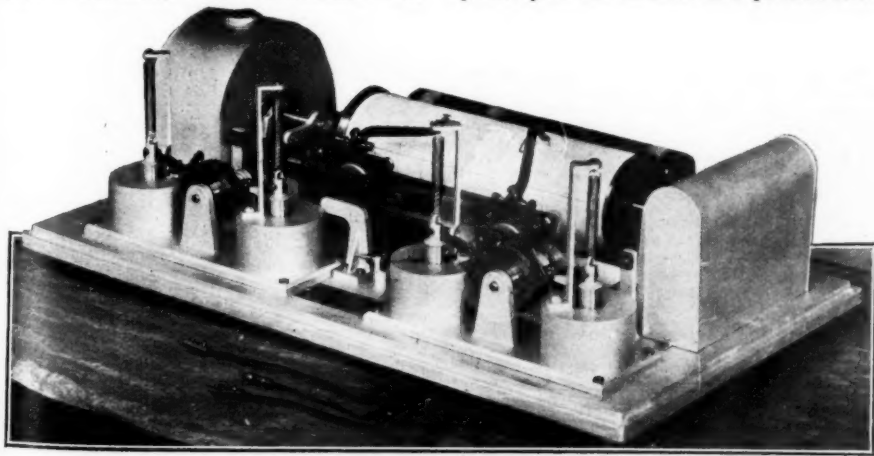
Cast Iron Pipe.—Prices have again risen—this time \$2 a ton since last week. Quotations: Chicago—4-inch, class B and heavier, \$63.50; 6-inch, \$60.50. New York—4-inch, Class B and heavier, \$63.50; 6-inch, \$60.50. Birmingham—4-inch, class B and heavier, \$58; 6-inch, \$55; class A, \$1 extra. Lettings are being postponed because of high prices.

The Orenstein-Arthur Koppel Co., Peoples Gas Building, Chicago, Ill., has received a sub-contract for a narrow gauge railway for handling aggregate to be used on an 18½-mile road contract near Chicago by the Commonwealth Improvement Company. The railroad will consist of 8½ miles of Koppel portable track, the necessary Koppel dump cars, etc.

The Universal Portland Cement Co., 210 South La Salle street, Chicago, Ill., announces that B. F. Affleck has been re-elected president and T. J. Hyman secretary and treasurer, both of Chicago, at the annual meeting of the company, held at Gary, Ind., June 13, 1917. The company is a subsidiary of the United States Steel Corporation and has offices in Chicago, Pittsburgh, Minneapolis and Duluth; and plants at Buffington, Ind., Universal, Pa., and Steelton, Minn.

The Underwriters' Laboratories announce the following additions to their casualty council: Col. Lewis T. Bryant, Commissioner of Labor of the State of New Jersey, Trenton, N. J.; Lew R. Palmer, Department of Labor and Industry, Harrisburg, Pa., and A. H. Young, director of the American Museum of Safety, New York.

Duty on Well-Drilling Apparatus in Canada.—The Canadian Commissioner of Customs has ruled that machinery and apparatus for drilling for water, natural gas, or oil, in general, shall no longer be regarded as of a kind not manufactured in Canada and therefore not entitled to free admission under tariff item 469. Previously such apparatus was exempted from the regular customs duty, though not from the special war surtax, which in the case of imports from the United States amounts to 7½ per cent. ad valorem. Under the new classification, most of



LONG DISTANCE WATER LEVEL RECORDER.

this apparatus will be dutiable upon importations from the United States as machinery not otherwise specified under tariff item No. 453, at 35 per cent. ad valorem, including the special war surtax. Specifically excepted from this ruling and therefore entitled to admission at the former reduced rate of duty are the following apparatus and supplies: Well-drilling machinery operated on the "rotary flush," "jetting flush," or "hydraulic" systems, in which chisel-shaped drills are not used (not including motive power); steel nipples for recutting threads on casings or casing coupling when lost in the well; well packers; swivel wrenches; and certain heavy apparatus, such as drilling bits over 1,100 pounds. Special cases may be referred to the Department of Customs for ruling when the importer desires to appeal from the classification adopted.

Waterworks Machinery.—A firm in Brazil is in the market for compressed-air pumps, electrical equipment, dynamos, etc., for the enlargement of a city water supply. Quotations should be made f. o. b. New York. Cash will be paid in advance. Correspondence should be in Portuguese, if possible, otherwise Spanish. Write to the Bureau of Foreign and Domestic Commerce, Washington, D. C., and refer to "opportunity No. 24680."

NEWS OF THE SOCIETIES

(Continued from page 836.)

cause of the war situation to cancel the date of the annual convention at Cedar Point in July and not to hold a convention in 1917. This action followed thorough deliberation, and excepting for the canceling of the annual convention all activities of the association will be continued in full force during the coming year.

Illuminating Engineering Society, Philadelphia Section.

"A Year's Progress in the Manufacture of Mazda Lamps" was the subject of a talk by Unit Rasin before the Philadelphia Section of the Illuminating Engineering Society on May 18. Dr. H. E. Ives continued his "Elementary Talks," which were started at a previous meeting of the society.

Merchants' Association of New York.

Officers of the Merchants' Association of New York for the coming year have been elected by the board of directors as follows:

President, William Fellowes Morgan, president of the Brooklyn Bridge Freezing and Cold Storage Company; first vice-president, Lewis E. Pierson, chairman of the Board of Austin, Nichols & Company, Incorporated; second vice-president, James G. White, president of J. G. White & Company, Incorporated; third vice-president, William Hamlin Childs, president of the Barrett Company; treasurer, Silas D. Webb, chairman of the Board of the China and Japan Trading Company; secretary, S. C. Mead.

National Gas Engine Association.

The National Gas Engine Association has voted to affiliate with the Society of Automotive Engineers in engineering matters, having particularly the object of speeding up the general standardization movement.

New York Electrical Society.

The annual meeting of the New York Electrical Society for the election of officers was held June 14 at the Engineering Societies' Building, 29 West Thirty-ninth street. The following were chosen for the ensuing year: President, Dr. A. S. McAllister; vice presidents, J. P. Carey, Walter Neumuller, and George H. Barbour; treasurer, Thomas F. Honahan; secretary, George H. Guy.

New England Section, N. E. L. A.

At a meeting of the executive committee of the New England Section of the National Electric Light Association it was decided, because of the war situation, to cancel the ninth annual convention, scheduled to be held at New London, Conn., on September 11-14, 1917. A meeting in Boston is planned, but the date has not yet been determined. The meeting will take the form of a war conference on important problems.

United States Civil Service.

The United States Civil Service Commission announces open competitive examinations, for men only.

Assistant Constructing Engineer (July 10, 1917):

A vacancy at the Frankford Arsenal, Philadelphia, Pa., at \$2,200 a year, and future vacancies requiring similar qualifications will be filled from this examination.

The appointee will have direct charge of the draftsmen engaged in the design, etc., of buildings, railroads, and other works to be constructed at the arsenal, and also of the building inspectors engaged in the supervision of their construction. The applicant should have had sufficient architectural training to enable him to design all kinds of concrete (plain and reinforced) or steel-frame structures and have a thorough theoretical and practical knowledge of the uses and qualities of construction materials, and of the commercial standards used in buildings of the factory, office and residence type.

Competitors will not be required to report for examination at any place, but will be rated on the following subjects, which will have the relative weights indicated:

Subjects.	Weights.
1. Education and preliminary training	40
2. Responsible experience and fitness	60
Total	100

The applicant must have had at least ten years' building and construction experience, not less than three of which must have been in an executive position in the drafting room, and of these three not less than two years in architectural design. In addition to these three not less than two years of the required experience must have been in supervision of building construction. Technical education along engineering or architectural lines in a college or university of recognized standing will be considered equivalent to not more than four years of the remaining five years.

Mechanical Laboratorian (July 11, 1917):

Vacancies occurring in the Navy Yard Service, at \$4.24 per diem, will be filled from this examination.

The duties of the position are to assist mechanical engineers in the conduct of mechanical tests upon materials, apparatus, and machinery, and include calibration of instruments, taking

observations, calculating and plotting results of tests, making sketches and drawings of machines under test, and designing test appliances. These duties require a knowledge of mathematics, including algebra, plane and solid geometry, mensuration, plane trigonometry, use of logarithms, analytic geometry, differential and integral calculus; physics, with special emphasis upon elementary mechanics and electricity; elementary chemistry and metallurgy; elementary steam engineering and thermodynamics; elementary machine design; shop process; elementary experimental engineering (theory and use of engineering and physical measuring instruments); and the ability to make a good mechanical drawing and to letter well. It is desired to secure eligibles of high scholastic attainments who have shown a special aptitude for experimental work.

Competitors will be examined in the following subjects, which will have the relative weights indicated:

Subjects.	Weights.
1. Practical questions covering steam engineering, thermodynamics, shop processes and machine design, and experimental engineering. 60	
2. Mechanical drawing and lettering (sample to be delivered to the examiner on the day of examination) ..	10
3. Education and experience ..	30
Total	100

The applicant must show that he has graduated from a four years' course in mechanical engineering from a college or technical school of recognized standing; or that he is a senior student in such an institution and expects to graduate within six months from the date of the examination; or that he is a graduate from a four years' high-school course or has had four full years of study in a school offering a course equivalent to that of a high school, and has had in addition two years of experience that would fit him for the performance of the duties of this position as above outlined.

Under the second subject applicants will be required to deliver to the examiner on the day of the examination a specimen of pencil drawing (mechanical) and a tracing thereof.

Junior Drainage Engineer (July 11, 1917):

Present and future vacancies in the Office of Public Roads and Rural Engineering, Department of Agriculture, for service in the field, at entrance salaries ranging from \$1,080 to \$1,320 a year, and in positions requiring similar qualifications, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion. Appointees will be eligible for promotion through the grades of drainage engineer and senior drainage engineer to \$3,000 a year. Certification to fill the higher salaried positions will be made from those attaining the highest average percentages in the examination.

The duties of this position will be to assist in making surveys, preparing plans and reports upon drainage projects, collecting technical data, and conducting original investigations. This work does not include the drainage of irrigated lands.

Ordinary traveling and subsistence expenses will be allowed when junior engineers are away from official or temporary headquarters.

Competitors will be examined in the following subjects, which will have the relative weights indicated:

Subjects.	Weights.
1. Mathematics and mechanics, pure and applied	40
2. Surveying, engineering and drainage	40
3. Education and experience ..	20
Total	100

Graduation from a full four years' course in civil engineering from a school or college of recognized standing, or at least four years' actual civil engineering experience, both technical and practical, is a prerequisite for consideration for this position. A knowledge of agriculture is not required, but will be given credit under Subject 3.

Applicants for all these positions should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

CONTRACTS AWARDED ITEMIZED PRICES

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
N. J.	Trenton	2.30 p.m., June 22	Oiling 70,000 to 170,000 sq. yds. macadam streets with 60 per cent to 65 per cent asphaltic oil	Engineer of Streets.
Cal.	Sacramento	10 a.m., June 22	Grading and installing bridges and culverts on 1.6 miles of road	Co. Highway Commission
O.	Cincinnati	noon, June 22	30,000 gals. bituminous binder for bituminous concrete	Edna von Hagen, Pur. Agt.
O.	Cheviot	noon, June 23	Furnishing oil and oiling streets	A. J. Reusing, Village Clerk.
Mo.	St. Louis	June 23	Improving streets and alleys	E. R. Kinsey, Pres. Bd. of Public Service.
Cal.	Upland	June 25	14 blocks 4-in. concrete pavement with bit. surfacing	C. P. Fuller, City Clerk.
Mich.	Marquette	5 p.m., June 25	Clearing, grubbing, grading and macadamizing 3,345 lineal feet road	J. E. Vaughan, City Clerk.
Minn.	St. Paul	10.30 a.m., June 25	Grading, curbing and paving on a number of streets	H. W. Austin, Pur. Agt.
Cal.	Visalia	June 25	Two sections state highway	State Highway Comr., Sacramento
Wash.	Olympia	June 25	Grading, draining and surfacing 2 miles of Inland Empire highway from Idaho line west	James Allen, State Highway Comr.
La.	Gretna	June 25	Paving with bitulithic and granite block	John Ehret, Mayor.
Cal.	Sacramento	June 25	48.9 miles state highway	State Highway Commission.
La.	Crowley	noon, June 26	70 miles hard surfaced road	Board of Parish Supervisors
N. J.	Rahway	8 p.m., June 26	Furnishing and setting 710 ft. blue stone curbing and re-setting 2,349 ft. old curb	Franklin Marsh, City Engr.
Tenn.	Fayetteville	June 26	12,000 sq. yds. wood, brick, asphalt or concrete pavement; curbs and sewers	W. G. Kirkpatrick, Engr., Farley Bldg., Bmghm., Ala.
O.	Ironton	2 p.m., June 26	Water bound macadam highway	Clinton Cowan, State Highway Comr., Columbus, O.
Ky.	Cynthiana	10 a.m., June 26	Turnpike construction	Co. Road Engr.
O.	Columbus	2 p.m., June 27	Brick, concrete, bituminous macadam and water bound macadam highway construction; grading, culverts, surface treatment and repairs on a number road jobs	Clinton Cowan, State Highway Comr., Columbus, O.
O.	Orrville	June 27	Improving S. Main St.	A. Jenny, Village Clerk
Ind.	Indianapolis	10 a.m., June 28	Constructing roads	L. K. Fesler, Co. Aud.
La.	Kinder	10 a.m., June 28	Constr. all proposed highways in Allen parish	W. L. Stevens, Engr., Whitney-Central Bank Building, New Orleans.
Ont.	Dunnville	8 p.m., June 28	6,650 sq. yds. concrete pavement	S. Shupe, Engr.
N. J.	Newark	3.30 p.m., June 28	2,000 sq. yds. bitulithic pavement and 1,000 ft. of curb	M. R. Sherrerd, Chief Engr.
N. Y.	Poughkeepsie	4 p.m., June 28	26,500 sq. yds. Topeka, 1,400 sq. yds. brick and 11,500 ft. bluestone curb	E. W. Sylvester, Supt. P. Wks.
La.	Oberlin	June 28	Clearing and building roads	W. L. Stevens, Whitney-Central Bk. Bldg., New Orleans.
Ore.	Astoria	June 28	Road surfacing; cost, \$16,500	J. C. Clinton, Co. Clerk.
Ind.	Indianapolis	10 a.m., June 28	Road construction	L. K. Fesler, Marion Co. Aud.
Pa.	Wanamie	7 p.m., June 29	Grad., curbing and paving with block, in Newport Twp.	W. S. Norton, Twp. Engr., Alden Station, Pa.
Me.	Augusta	11 a.m., June 29	15.57 miles bit. macadam and 10.07 miles gravel surface, including draining and grading	Paul D. Sargent, State Highway Comr.
Pa.	Newport	7 p.m., June 29	Paving with brick, streets in several villages	W. S. Norton, Twp. Engr., Alden Sta., Pa.
Ind.	Munsey	10 a.m., June 30	Street improvements	John R. Kelley, City Clerk.
Minn.	Pine City	June 30	Highway construction, cost \$160,000	County Commissioners
W. Va.	Adamston	June 30	Street paving	R. R. Powell, City Recorder.
Ill.	Lenox	10.30 a.m., June 30	Unloading and hauling crushed stone for 1 1/4 mi. of road	Town Clk., New Lenox.
Ind.	Terre Haute	11 a.m., June 30	Gravel road	Thos. Ferguson, Co. Aud.
Ind.	Rockport	2 p.m., July 2	Rock road	J. Frank Stocking, Co. Aud.
Ind.	Angola	1 p.m., July 2	County road work	J. W. Pence, Co. Aud.
O.	Ashtabula	1 p.m., July 2	Paving roads	County Surveyor.
W. Va.	Hamlin	July 2	2.6 miles of road and two bridges	A. F. Black, Co. Clerk.
Md.	Frederick City	1 p.m., July 2	4.38 miles state aid road	F. M. Stevens, Pres. Co. Commissioners.
Ind.	Williamsport	2 p.m., July 2	18,364 ft. gravel roads	D. H. Moffitt, Co. Auditor
Ind.	Nashville	1 p.m., July 2	Three stone and gravel and one concrete roads	Omer Morrison, Co. Auditor
Ind.	Brazil	10.30 a.m., July 2	Stone and gravel roads	W. O. Graesser, Co. Aud.
Ind.	Rushville	2 p.m., July 2	15,800 ft. macadam road construction	W. H. McMillin, Rush Co. Aud.
Ind.	Madison	1 p.m., July 2	One portable gyratory rock crusher, capacity 10 to 20 tons per hour, equipped with trucks, etc.	Chas. S. Dibler, Jefferson Co. Aud.
Ind.	Monticello	10 a.m., July 3	Two crushed stone roads and 1 gravel road	A. D. Fisher, White Co. Aud.
Ind.	Washington	2 p.m., July 3	Pike road construction	J. G. Clark, Daviess Co. Aud.
Ind.	Columbia City	noon, July 3	Constructing gravel road	T. A. McLaughlin, Whitley Co. Aud.
Ind.	Crawfordsville	10 a.m., July 3	Gravel road construction	W. F. Batman, Montgomery Co. Aud.
Ind.	Rochester	2 p.m., July 3	Constructing township road	E. A. Smith, Co. Aud.
Ind.	Bloomfield	2 p.m., July 3	Gravel roads	G. E. Kidd, Co. Aud.
Ind.	Salem	1.30 p.m., July 3	16,775 ft. road work	E. E. Batt, Co. Aud.
Ind.	Albion	2 p.m., July 3	Brick road	G. A. Young, Co. Aud.
Ind.	Greenfield	10 a.m., July 3	Four gravel and brick roads	H. J. Rhue, County Aud.
Ind.	Rensselaer	2 p.m., July 3	Constructing three roads	J. P. Hammond, County Aud.
Ind.	Marion	2 p.m., July 3	Constructing gravel road	Mort McRae, County Aud.
Ind.	Shelbyville	10 a.m., July 3	Gravel for repaving county roads	F. W. Fagel, Co. Aud.
Ind.	Lafayette	10 a.m., July 3	Monolithic and semi-monolithic brick roads; about 64,000 yards	E. C. Minton, Engr.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ind., Wabash	.....10 a.m., July	3..	Two macadam roads	F. P. Kircher, Co. Aud.
Ind., Mt. Vernon	.....2 p.m., July	3..	Gravel road	J. R. Haines, Co. Aud.
Ind., Madison	.....1.30 p.m., July	3..	Constructing crushed stone roads	Charles S. Dabler, Jefferson Co. Audr.
Ind., Lebanon	.....10 a.m., July	3..	Gravel road	Cleve Goodwin, Boone Co. Audr.
N. H., Claremont	.....July	6..	8,000 sq. yds. Topeka pavement, 2,000 ft. concrete curb, and 1,000 ft. sewers	G. P. Winn, Engr., Nashua, N. H.
Ala., Selma	.....noon, July	7..	Paving about 25,000 sq. yds. with asphalt, asphaltic concrete, bitulithic or brick	W. O. Crisman, City Engr.
Minn., Duluth	.....July	9..	Improving 8.5 miles road	Odin Halden, County Aud.
N. Y., Albany	.....July	9..	26 highway repair contracts, including resurfacing, reconstruction and surface treatment. Also 4,025 tons broken stone for three jobs	Edwin Duffy, State Hwy. Comr.
N. Y., New York	.....11 a.m., July	10..	Laying brick pavement in Kensico Aerator	Bd. of Water Supply, Municipal Bldg.
N. J., Newark	.....2:30 p.m., July	12..	Improving Little Falls Rd.	E. A. Reimer, Co. Engr.
Ind., Rochester	.....2 p.m., July	14..	Gravel road	E. A. Smith, Co. Auditor
Ind., Shelbyville	.....July	17..	Cement sidewalks	W. S. Jones, City Clk.
Ia., Council Bluffs	.....July	25..	Paving streets and alleys with concrete 16 ft. wide	E. V. Gustafson, City Clerk.
Ida., Lewiston	.....Aug.	13..	95,000 sq. ft. concrete walks, 21,000 ft. concrete curb and 23,000 cu. yds. grading	C. F. Leland, City Clerk
SEWERAGE.				
Minn., Ortonville	.....10 a.m., June	22..	Tile drainage ditches	A. V. Randall, Co. Aud.
Wis., Hillsboro	.....7 p.m., June	22..	4,127 ft. 6 to 12-in. sewers	W. G. Kirchoffer, Engr., Madison, Wis.
Ia., Council Bluffs	.....June	25..	Sewers in several streets	E. V. Gustafson, City Clerk.
Ind., Kokomo	.....June	25..	Constructing 8-in. sewers	Bd. of Public Wks.
N. Y., Syracuse	.....1:30 p.m., June	25..	41,355 ft. 6 to 36-in. sewers, 67 manholes, 1 sedimentation basin and 31 catch basins	R. D. Rooney, Sec. Bd. of Contract & Supply.
Tex., Yoakum	.....8 p.m., June	25..	Constructing 4,175 ft. sanitary sewer	W. Lander, City Mgr.
Minn., St. Paul	.....10.30 a.m., June	25..	Sewer construction on a number of streets	H. W. Austin, Pur. Agt.
Ind., Gary	.....June	25..	Sewer construction	W. P. Cottingham, City Engr.
N. Y., Syracuse	.....June	25..	42,500 ft. 6, 8, 10, 12, 15, 18, 20, 24, 27, 33 and 36-in. vit. pipe	H. E. Allen, City Engr.
Minn., Rochester	.....June	25..	Sewer construction	A. F. Wright, City Clerk.
Ia., Clarinda	.....June	25..	580 ft. reinforced concrete sewer	T. A. Wilson, City Mgr.
Ill., Berwyn	.....8 p.m., June	26..	Vit. tile house drains in a number of streets	E. Hancock, Engr., 2047 Ogden Ave., Chicago.
Tenn., Fayetteville	.....June	26..	Constructing pipe sewers	City Clerk.
Va., Roanoke	.....noon, June	26..	Constructing sanitary sewer	F. L. Gibboney, City Engr.
Minn., Benson	.....2 p.m., June	26..	Tile drainage ditches; cost, \$50,000	C. L. Kane, Atty.
Ind., Hartford City	.....2 p.m., June	26..	Constructing drainage ditch	Fred. Glancy, Co. Surv.
N. J., Newark	.....June	26..	Generators and engines	Passaic Valley Sewerage Comm.
Ill., Warsaw	.....2 p.m., June	26..	Sanitary sewer construction	W. L. Hill, Mayor.
Ill., Chicago	.....June	28..	Pumping equipment at Calumet sewage pumping station	John McGillen, Clerk, Sanitary Dist. of Chicago.
Wyo., Casper	.....2 p.m., June	28..	3,300 ft. 60-in. storm sewer; 3,300 ft. 48-in.; 1,600 ft. 36-in.; 400 ft. 30-in. storm sewers; 3,700 ft. 15-in., 7,000 ft. 12-in. and 15,000 ft. 8-in. sanitary sewers	L. F. Worthington, City Engr.
O., Springfield	.....noon, June	28..	Sewer in Fountain Ave.	J. Sahin, City Engr.
N. C., Ft. Caswell	.....2 p.m., June	28..	2,060 ft. 8-in. universal pipe sewer	Constructing Quartermaster.
Ind., Bloomington	.....7:30 p.m., June	29..	Constructing sanitary sewer	Guy A. Davis, City Clerk.
Ind., Earl Park	.....2 p.m., June	30..	Cleaning and repair of tile ditches	S. N. Geary, Trustee Richland Twp.
O., Jacksontown	.....June	30..	Sewage disposal plant and sewerage connected with school building	L. A. Osborn, Clerk, Board of Education.
Minn., Austin	.....10 a.m., June	30..	Excavation, ditching and tiling	A. C. White, Co. Supt. Construction.
N. D., Fessenden	.....July	1..	Constructing water works and sewer system	T. R. Arnold, Engr., Minot.
N. D., Leeds	.....July	1..	Water works and sewers; cost, \$35,000	T. R. Arnold, Engr., Minot.
Wis., Appleton	.....9 a.m., July	2..	Sewer construction	E. L. Williams, City Clerk.
Ia., Ankeny	.....July	3..	13,000 ft. vit. pipe sewer and disposal plant	A. L. Stapleton, City Clerk.
Ind., Kendallville	.....8 p.m., July	3..	Constructing two sanitary sewers	O. E. Michaelis, City Clerk.
Minn., Pine City	.....7:30 p.m., July	7..	1,750 ft. vit. sewers	J. F. Druar, Engr., Commercial Bldg., St. Paul.
Ariz., Flagstaff	.....July	3..	Sewer extensions; \$55,000 available	A. A. Johnson, City Clerk.
Ia., Davenport	.....July	3..	Storm drain; cost, \$80,000	Board of Public Works.
Mich., Flint	.....9 a.m., July	6..	County drain construction	A. H. Reid, Co. Comr.
N. H., Claremont	.....July	6..	1,000 ft. of sewer 6 ft. deep	G. P. Winn, Engr., Nashua, N. H.
N. J., Newark	.....July	10..	Foundations and c'n'ctions for pump. sta. in Wallington	Passaic Valley Swge. Comm.
Conn., Bridgeport	.....8 p.m., July	12..	Constructing pump house and furnishing sewage pumping equipment	H. Terry, City Engr.
Minn., St. Cloud	.....9 a.m., July	20..	8,850 ft. tile drains	Nicholas Thomey, Co. Aud.
Okla., Billings	.....Aug.	1..	Sewer, waterwks. system and light. plant; cost, \$60,000	L. Pantou, Pres. Bd. of P. W.
WATER SUPPLY.				
N. Y., Buffalo	.....11 a.m., June	22..	Furnishing hydrants and valves for one year	A. W. Kreinheder, Comr. Public Works.
Ariz., Wickenburg	.....8 p.m., June	23..	Installing electric lighting system and extending and improving water system	H. P. Ward, Town Clerk.
O., Cleveland	.....noon, June	23..	Furnishing pig lead	Comr. Purchases & Supplies.
Md., Annapolis	.....11 a.m., June	25..	Constructing artesian well	Bureau of Yards and Docks, Navy Dept., Washington.
D. C., Washington	.....June	25..	Artesian well at Naval Academy, Annapolis	Bur. of Yards & Docks.
D. C., Washington	.....June	25..	6-in. flexible joint submerged pipe line at San Francisco	Bur. of Yards & Docks.
Va., Lynchburg	.....noon, June	25..	Constructing filtration plant, etc.	H. L. Shaner, City Engr.
Mont., Livingston	.....3 p.m., June	26..	Pumping station, concr. reservoir, pipe, and 3,000,000-gal. filter unit	Burns & McDonnell, Engrs., Interstate Bldg., Kan. City, Mo.
Ill., Berwyn	.....8 p.m., June	26..	Lead service pipes on various streets	E. Hancock, Engr., 2047 Ogden Ave., Chicago.
N. J., Barfield	.....8 p.m., June	26..	Reinforced concrete receiving basin, rearranging of suction mains and furnishing and laying 6-in. c. i. supply pipe	A. L. Ketterson, City Engr., P. O. Bldg., Passaic.
Que., Pointe Claire	.....3 p.m., June	27..	Water filtration plant and low-lift pumps	R. S. & W. S. Lea, 809 New Birks Bldg., Montreal.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Md., Baltimore.....	11 a.m., June 27..	Furnishing iron castings, brass fittings and casting, lead-lined w. i. pipe, bronze castings, c. i. pipe and fittings and pig lead	W. E. Lee, Water Engr.	
O., Cincinnati.....	noon, June 28..	Iron sulphates for filtration plant.....	C. F. Hohenberger, Dir., Public Service.	
Ill., Maywood	8 p.m., June 28..	Drilling artesian well	E. J. Theilin, Village Clerk.	
Mich., Detroit	11 a.m., June 30..	Machinery and valves for lock in St. Marys Falls Canal.....	U. S. Engineer's Office.	
N. D., Fessenden.....	July 1..	Sewers and water works system; cost, \$55,000.....	T. R. Arnold, Engr., Minot.	
N. D., Leeds	July 1..	Water works and sewers; cost, \$35,000.....	T. R. Arnold, Engr., Minot.	
N. D., Hazen	8 p.m., July 2..	Constructing water works.....	Geo. Freer, Village Clerk.	
O., Chardon	July 3..	Installing water works system.....	R. S. Parks, Village Clerk.	
Ky., Winchester	July 6..	Water works system.....	C. B. Tracy, City Clerk.	
N. Y., New York.....	11 a.m., July 10..	Furnishing and installing laboratory fittings.....	Board of Water Supply.	
Minn., Duluth.....	11 a.m., July 10..	20,000,000 gals. electric cent. pump.....	P. G. Phillips, Comnr. P. W.	
Ind., Portland	9 a.m., July 10..	Water filtering and softening plant, walks, etc., at new Court House	John Bonifas, Co. Aud.	
N. Y., New York.....	11 a.m., July 17..	Shandaken tunnel, 18 miles long and 10 ft. 3 ins. x 11 ft. 6 ins., lined with concrete	Bd. of Water Supply, Municipal Bldg., New York.	
Okla., Billings	Aug. 1..	Waterworks, light, and sewer systems; cost, \$60,000....	L. Pantou, Pres. Bd. of P. W.	
MISCELLANEOUS.				
Minn., Chaska	June 22..	Ditching and fencing; cost, \$13,700.....	J. B. Connolly, Co. Aud.	
N. Y., Newark.....	noon, June 22..	Two boilers, piping, stokers, etc., at asylum.....	L. F. Pilcher, State Archt., Albany, N. Y.	
Wash., Seattle	June 22..	500 k.w. motor generator and four oil switches.....	Board of Public Works.	
Cal., Olive	June 23..	Furnishing 1,750 piles, wood or wire fence, steel wire, etc.....	Olive and West Olive Protection District	
Ore., Cloverdale.....	10 a.m., June 23..	Constructing drainage ditches and selling \$8,000 bonds..	Big Nestucca Drainage Dist.	
N. Y., New York.....	2:30 p.m., June 25..	Furnishing and delivering gravel.....	Central Purchase Committee, Municipal Bldg.	
N. Y., New York.....	11 a.m., June 25..	Playground and gymnasium apparatus.....	Supt. of School Bldgs.	
N. Y., New York.....	2 p.m., June 25..	Refuse incinerating plant in Washington Market.....	Comr. Pub. Wks., Mun. Bldg.	
Wash., Seattle	10 a.m., June 25..	Sale of two 2-ton Troy dump wagon trailers.....	Board of Co. Comrs.	
N. Y., Albany.....	noon, June 26..	Constr. movable dam to replace Dam 14 at Herkimer....	W. W. Wotherspoon, Supt. Public Works.	
O., Cincinnati.....	10 a.m., June 28..	Two reinforced concrete wading pools, cement sidewalks and other improvements.....	Board of Park Comrs.	
N. J., Newark.....	3:30 p.m., June 28..	Picking and carting metal, glassware, bottles, rags, paper, tinware, bones, etc., from city dumps.....	M. R. Sherrerd, Ch. Engr., Dept. Public Works.	
Fla., Arcadia	June 30..	Drainage ditches, requiring about 440,000 cu. yds. excavation	Cravens & Kimmel, Engrs., Parker Building	
Mich., Detroit	June 30..	Machinery and valves for Fourth Lock, St. Mary's Falls Canal	U. S. Engr. Office.	
O., Columbus.....	noon, July 1..	Constructing steel dredge; to be three-fourths-yard portable, oil burning.....	F. R. Fauver, Supt. of Public Works, State House Annex.	
Ind., Madison.....	1 p.m., July 2..	One portable gyratory rock crusher with a capacity of 10 tons to 29 tons per hour.....	Charles S. Dibler, Co. Audr.	
Mo., St. Louis.....	July 2..	190,000 cu. yds. earth work in Mascatine Island levee dist., Iowa	Mississippi River Comn., International Life Bldg.	
N. D., Mott.....	2 p.m., July 2..	1 large grader, 6 road drags and 6 Fresno or Buck scrapers	E. C. Roberts, Co. Aud.	
Tenn., Memphis	July 2..	Furnishing concrete mixer, engines, belt elevators and conveyors, etc.	Miss. River Comn.	
N. Y., Buffalo.....	11 a.m., July 16..	Constructing stone and concrete superstructure on breakwater	U. S. Engineer, Buffalo.	

STREETS AND ROADS.

Berkeley, Cal.—Resolution adopted for improving Ashby Ave. from the eastern line of Claremont Ave. easterly to the western line of Domingo Ave., graded, reinforced concrete main wall 80 ft. long and 14-in. vitrified ironstone pipe sewer. A. G. Briggs, city clerk.

Lodi, Cal.—City Trustees of Lodi, San Joaquin county, have been petitioned to change specifications for paving Oak St. from 40 to 50 ft.

Oroville, Cal.—Butte county will make its first experiment in paved roads this summer. The Board of Supervisors has decided to pave the section of road leading from the Northern Electric depot in East Gridley to Gridley with an asphalt covering over the present macadam. An investigation of this type of road in other counties was made by County Surveyor M. C. Polk and Supervisor Evans, estimated cost of the improvement is \$2,500 a mile. Supervisor Holmes will also build a half mile of the paved road on one of the highways in his district leading out of Chico.

Oroville, Cal.—Plumas county will be asked to join Butte county in requesting that the state highway commission immediately make a survey of the North Fork route for a highway across the Sierra through Feather River Canyon.

Woodland, Cal.—Yolo County Auditor R. P. Wallace has begun purchasing rights of way between Zamora and the Colusa County line for the completion of the state highway in this county. Preliminary prices have been agreed upon.

Montezuma, Ga.—City voted in favor

of issuing \$25,000 street improvement bonds. J. A. Harrison, City Clerk.

McKay, Ida.—Custer County Comrs. plan expending \$150,000 this summer in the improvement of feeders to the state highway post road.

Sandpoint, Ida.—Bonner County Commissioners are considering calling an election to vote a \$150,000 bond issue.

Danville, Ill.—Bids received June 25, 1917, at 10:30 a. m., by Treas. of Hendricks County, for sale \$22,000 highway improvement bonds, 4½ per cent., ten years. J. W. Patterson, Treas.

Morris, Ill.—Property owners want council to continue the paving in Tremont Ave. also Vine St. and Jackson to Oak St.

Rock Island, Ill.—City to pave with asphaltic concrete Sixth Ave. from Thirty-eighth to Forty-fifth St., according, provision is made for a 48-ft. highway and a 12-ft. boulevard. Estimated cost is \$21,623.11.

Rock Island, Ill.—Council adopted an ordinance providing for the paving and extending of 11th St. from 18th to 25th Aves. with asphalt.

Rock Island, Ill.—Board of Supervisors proposed purchase of additional land in order to eliminate a double curve in the road leading to the new Colona bridge.

Anderson, Ind.—Bids received June 25, 1917, at 10 a. m., by Treas. of Madison County, for sale, \$20,000, \$17,000, \$20,000, \$20,000, \$16,000, \$6,000 and \$4,200 highway improvement bonds, 4½ per cent., ten years. George T. Beebe, Treas.

Blomington, Ind.—Bids received June 25, 1917, at 2 p. m., by Treas. of Monroe County, for sale, \$7,000, \$11,200 and \$6,850 highway improvement bonds, 4½ per cent., ten years. R. Walker, Treas.

Covington, Ind.—Bids received July 7, 1917, at 10:30 a. m., by treasurer of Fountain county, for sale \$12,500 highway improvement bonds, 4½ per cent., ten years. Lee Philpott, Treasurer.

Indianapolis, Ind.—Marion county officials and Colonel Edwin T. Glenn, commanding at Ft. Benjamin Harrison agree on roads improvement leading to Ft. Harrison from Indianapolis. Work will proceed rapidly, bids have been invited for the Fifty-fourth St. road from Milledale to the Fort.

Kokomo, Ind.—Bids received June 25, 1917, at 10 a. m., by treasurer of Howard county, for sale \$3,200 highway improvement bonds, 4½ per cent., ten years. Ora J. Davies, Treasurer.

Mishawaka, Ind.—Sidewalk and curb will be constructed on State St. from Lincoln Highway to Mishawaka Ave. July 2 was set as date for a hearing. A similar resolution was passed for the improvement of Gernhart Ave.

Peru, Ind.—Bids received June 28, 1917, at 2 p. m., by treasurer of Miami county, for sale \$10,450 and \$5,750 highway improvement bonds, 4½ per cent., 20 and 10 years. Aaron B. Zook, Treasurer.

Rensselaer, Ind.—Bids received June 22, 1917, at 1 p. m., by Treas. of Jasper County, for sale, \$9,200, \$10,400, \$11,600, \$7,800 and \$6,400 highway improvement bonds, 4½ per cent., ten years. Chas. V. May, Treas.

Shelbyville, Ind.—No bids were received by Shelby County Comrs. at their June session for the unfinished road in Sugar Creek Twp.

Valparaiso, Ind.—No bids were submitted to Porter County Comrs. for Union Twp. Rd., advertised for letting at their June meeting.

Sacramento, Cal.—Bids opened by State Highway Commission, June 4, for constructing a state highway in Tulare Co., Division VI, Route 4, Section A1. Material furnished by state: Pipe railing, reinforcing steel, corrugated metal pipe, portland cement, sand and coarse aggregate; amount, \$37,673.50.

The M. R. Co., Inc., W. A. Kettlewell & Sons, Leigh G. Garnsey, Rogers Bros. Co., G. S. Benson & Sons,

igh G. Garnsey, Rogers Brog. Co., G. S. Benson & Sons,
 Los Angeles Los Angeles Los Angeles

Los Angeles

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Sacramento, Cal.—Bids received by State Highway Commission, June 4, for constructing state highway in Shasta Co., Division II, Route 3, Section D. State furnishes pipe trailing, reinforcing steel, corrugated metal pipe, portland cement and new fence material; amount, \$14,859.94.

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Quayle & Fontaine, J. F. Fitzpatrick, Bonland & Ayer,
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Item	Bid	Amount	Bid	Amount	Bid	Amount
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Rate	Days	Amount	Days	Amount	
0.00	\$0.84½	\$127,595.00	\$1.00	\$151,100.00	
0.00		\$127,595.00		\$0.95	
					\$143,450.00

Year	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100																			
Population	1,410,500	1,420,000	1,430,000	1,440,000	1,450,000	1,460,000	1,470,000	1,480,000	1,490,000	1,500,000	1,510,000	1,520,000	1,530,000	1,540,000	1,550,000	1,560,000	1,570,000	1,580,000	1,590,000	1,600,000	1,610,000	1,620,000	1,630,000	1,640,000	1,650,000	1,660,000	1,670,000	1,680,000	1,690,000	1,700,000	1,710,000	1,720,000	1,730,000	1,740,000	1,750,000	1,760,000	1,770,000	1,780,000	1,790,000	1,800,000	1,810,000	1,820,000	1,830,000	1,840,000	1,850,000	1,860,000	1,870,000	1,880,000	1,890,000	1,900,000	1,910,000	1,920,000	1,930,000	1,940,000	1,950,000	1,960,000	1,970,000	1,980,000	1,990,000	2,000,000	2,010,000	2,020,000	2,030,000	2,040,000	2,050,000	2,060,000	2,070,000	2,080,000	2,090,000	2,100,000	2,110,000	2,120,000	2,130,000	2,140,000	2,150,000	2,160,000	2,170,000	2,180,000	2,190,000	2,200,000	2,210,000	2,220,000	2,230,000	2,240,000	2,250,000	2,260,000	2,270,000	2,280,000	2,290,000	2,300,000	2,310,000	2,320,000	2,330,000	2,340,000	2,350,000	2,360,000	2,370,000	2,380,000	2,390,000	2,400,000	2,410,000	2,420,000	2,430,000	2,440,000	2,450,000	2,460,000	2,470,000	2,480,000	2,490,000	2,500,000	2,510,000	2,520,000	2,530,000	2,540,000	2,550,000	2,560,000	2,570,000	2,580,000	2,590,000	2,600,000	2,610,000	2,620,000	2,630,000	2,640,000	2,650,000	2,660,000	2,670,000	2,680,000	2,690,000	2,700,000	2,710,000	2,720,000	2,730,000	2,740,000	2,750,000	2,760,000	2,770,000	2,780,000	2,790,000	2,800,000	2,810,000	2,820,000	2,830,000	2,840,000	2,850,000	2,860,000	2,870,000	2,880,000	2,890,000	2,900,000	2,910,000	2,920,000	2,930,000	2,940,000	2,950,000	2,960,000	2,970,000	2,980,000	2,990,000	3,000,000	3,010,000	3,020,000	3,030,000	3,040,000	3,050,000	3,060,000	3,070,000	3,080,000	3,090,000	3,100,000

1.60	.80	1,145.60	.75	1,074.00	1.00	1,432.00
1.00	1.00	1,175.00	0.00	1,058.40	1.95	1,470.00

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Winchester, Ind.—Randolph County highway bonds to amount of \$24,340 were sold to J. F. Wild & Co., Indianapolis, for premium of \$51.50. These are 4½ per cent, ten-year bonds.

Council Bluffs, Ia.—Alderman William-son and City Engineer Spetman approved the plan to connect Ridge road and Broadway with a new road.

Council Bluffs, Ia.—McPherson Avenue Improvement Club is planning to build sidewalks this summer.

Davenport, Ia.—Scott county board of supervisors adopted County Engineer J. M. Malloy's report on the inter-county road system upon which it is planned to expend approximately \$18,707 available under the federal road aid law. This report will be submitted to the Iowa State Highway commission for approval. The commission will, in turn, decide when Scott county shall receive its approximate allotment. The engineer recommended approximately 50 miles as follows: Davenport—Gambrell road via Eldridge, 17½ miles. Davenport—Durant road from Prospect to end of Scott county section—approximately 9 miles. Davenport—New Liberty road from Davenport to New Liberty—approximately 22½ miles. Davenport—Princeton road from Davenport to Wapsipinicon river—approximately 16½ miles.

Des Moines, Ia.—The construction of a 5-mile strip of pavement at an expenditure of \$132,000, to connect paved streets of Des Moines with Uncle Sam's military school at Camp Dodge, is contemplated by county and state officials here. The hard road will be necessary to accommodate heavy traffic in connection with transportation of army supplies and equipment. Overhead viaducts will be erected over interurban tracks and all surface crossings eliminated.

Keokuk, Ia.—City Council petitioned by property owners on Des Moines St. between 12th and 13th Sts. for resurface, so it can be oiled.

Mount Ayr, Ia.—State and U. S. Government to appropriate \$40,000 to build road in county. E. E. Cornwall Co. And

Sloux City, Ia.—Resolution started for the paving of South Wall St. from Chicago to Dace Ave. with 16 ft.

Sioux City, Ia.—25th St. from Jones to Jackson St., and South St. Aubin St. from 6th to Glenn Aves. ordered paved with concrete.

St. Louis City, Mo.—Concrete highways, aggregating a total expenditure of about \$70,000, are being contemplated for Woodbury county under the federal aid plan. First stretch would be to Cushing, second to Smithland and third, if built, to Sloan—specifications being drawn.

Nevada, Ia.—Center township decided in favor of issuing \$30,000 road bonds.

Independence, Kan.—City Commrs. petitioned for paving on North Third St. from Myrtle St. to Oak St.

Frankfort, Ky.—Council referred to the street committee with power to act the improvement of one block on Wilson St. in Bellepoint: of an alley between Capitol Ave. and Logan St. from Campbell St. to Todd St., and of a sewer at Elm St. and Burnside Chutes

Frankfort, Ky.—City Council authorized city engineer to advertise for bids for the reconstruction of Main St. from High St. to St. Clair, of St. Clair St. from Main to Bridge, and of Bridge St. from the bridge to Second St., with new brick, concrete, asphalt and with sheet asphalt.

Louisville, Ky—City plans to pave portions of a street asphalt, vitrified brick gutter and concrete curbs, Central Ave., vitrified blocks.

Augusta, Me.—The State Highway commission will ask the federal government for the sum of \$140,000 available under the act approved by Congress July 11, 1916, to assist in building the road from Topsham to Gardiner, a distance of 15½ miles, and will ask \$6,200 from the federal government to assist in building the road between Burnham and Palmyra, by way of Pittsfield, a distance of 6½ miles. The total amount allowed from the federal government for the two years, 1916 and 1917, is \$146,200, and of this amount \$48,750 was credited to last vitrified block.

Cumberland, Md.—Bids will shortly be called repaving streets, brick on concrete base.

Waltham, Mass.—Finance committee to report to the board for adoption of an order for the resurfacing of Prospect from Main to Crescent Sts., at an expense of \$15,500; also for a walk with

edge stone along the easterly side of Bright St.

Flint, Mich.—Common Council granted petitions for sidewalks on the west side of Prospect St. from Eighth Ave. to the present walks; and on the west side of Minnesota Ave. from Lena St. to Oklahoma Ave.

Sault Ste. Marie, Mich.—Board of public works has instructed to place 4 ins. of dolomite on Ryan St., between South and Valley Sts., and on Valley St. from Ryan to Summit St. The estimated cost is \$460. Ashmun St. from the top of the hill to 11th Ave., was ordered to be placed in first class condition.

Sault Ste. Marie, Mich.—Council ordered improvement to Peck St., between Fort and Meridian Sts., repaired by a crushed dolomite roadway 9 ft. wide, the estimated cost of which is \$962. The grading and ditching of the Shunk road from Spruce St. south a distance of 7,500 ft. All holes in the road will be filled with crushed rock; estimate, \$600.

Sault Ste. Marie, Mich.—Common Council ordered a stone roadway 16 to 18 ft. wide on East Portage, between Elm and Mission Sts., with a dolomite base and trap rock top with tarvia dressing. The estimated cost is \$2,750. The repair of Ridge St., from Magazine St. to the South Shore tracks with a crushed dolomite to a width of 9 ft., was ordered at an estimated cost of \$2,000.

Sault Ste. Marie, Mich.—Common Council authorized \$1,000 for placing Shallows road in good condition.

Sault Ste. Marie, Mich.—Council petitioned by residents on Ryan's subdivision to macadamize Parnell St., from Davitt to Dillion Sts., and on Davitt St., between Dillion and Emmett Sts.

Sault Ste. Marie, Mich.—Petitions for cement sidewalks on the following streets were referred to the streets and sidewalks committee: East side of John St., between Easterday and Adams Aves.; Ryan Ave., between South and Valley Sts.; Valley St., from Ryan Ave. to Prospect St. and 87 ft. past the alley.

Albert Lea, Minn.—Council decided to pave Harriet lane with concrete at once.

Duluth, Minn.—Council passed ordinances appropriating \$6,208.65 to defray the city's share of the cost of improving Second Ave. east from Second St. to Seventh St., \$1,500 for 1917 sidewalk construction.

Duluth, Minn.—Council petitioned for grading and the construction of a concrete curb on 20th Ave. west from First to Third Sts.

Duluth, Minn.—See "Streets & Roads."

Minneapolis, Minn.—Projects for the improvement of 103 miles of road in Minnesota, with federal aid, have been

approved by the Secretary of Agriculture. The work will cost \$316,200, half of which amount will be advanced by the federal government. Announcement of the arrangement was made by C. M. Babcock, highway commissioner.

St. Paul, Minn.—City Council hears first reading of ordinances for the city's share of paying. An appropriation of \$15,500 is asked for paving street intersections on Rice St. from University Ave. to the Northern Pacific tracks. Other works are: Como Ave. from Rice St. to the Great Northern Bridge, \$10,900; Concord St. from Ada St. to Annapolis St., \$7,500; Prior Ave. from University Ave. to Minnehaha St., \$1,925; Earl St. from Hastings Ave. to Thorn St., \$1,500. The total of the proposed appropriations is \$41,825.

Biloxi, Miss.—City Council are preparing to issue about \$55,000 bonds for resurfacing the city's streets, the building of additions to the city schools, the motorizing of the fire department, extension of the waterworks system and various other projects.

Charleston, Mo.—County plans election to vote on \$500,000 bonds to build roads.

Liberty, Mo.—Clay county will soon issue \$1,250,000 road bonds.

Springfield, Mo.—City plans to pave portion Main St., brick. O. D. Christman, City Engr.

Clovis, N. M.—County plans to build 100-mi. road. F. A. Cook, Co. Engr.

Grand Island, Neb.—City sold \$50,000 bonds to pave streets.

Atlantic City, N. J.—Business men and farmers of Salem, Gloucester and Cumberland counties here have asked for a paved boulevard from the Delaware to the coast, to open up the short city markets to the farmers of South Jersey.

Atlantic City, N. J.—Plans for the improvement of Maryland Ave. at Somers Point, from Bay Ave. to Main St., to straighten the Longport Blvd. where it enters Somers Point, was considered and a public hearing is to be called July 17 in Atlantic City on the question.

Atlantic City, N. J.—Road committee of the board of freeholders to consider the paving of the White Horse Pike from Absecon to the Camden county line at Trenton with the state highway commission.

Belleville, N. J.—Board of Commissioners authorized the issuance of \$50,000 temporary loan bonds for street improvements. Proceeds will be used as follows: \$30,000 for resurfacing macadam roads, \$18,000 for paving Division Ave., \$1,000 for laying sidewalks and gutters in Little and Floyd Sts., and \$1,000 for laying sidewalks and curbs in Hornblower Ave. and Van Houten place.

East Orange, N. J.—City plans to pave portion South Clinton St., bituminous concrete. W. D. Willegerod, City Engr.

Mt. Holly, N. J.—Board Freeholders receiving bids in July building concrete road from Pemberton to Lewiston.

Passaic, N. J.—Board of Freeholders instructed the supervisor to make temporary repairs to the Greenwood Lake road from the end of present macadam to the Cooley bridge.

Passaic, N. J.—Board of Freeholders adopted resolution authorizing the issuance of \$251,000 worth of road bonds for improvements to county roads. Bids for sale of bonds will be received July 11 at Court House, 2 p. m.

Passaic, N. J.—Board of Freeholders adopted a resolution for a permanent improvement of Franklin Ave. through Delawanna, to the Essex county line. The work will be of concrete, with wooden blocks next to the rails.

Toms River, N. J.—The Ocean County Board of Freeholders voted to spend \$67,000 on county road repair work this year.

Trenton, N. J.—An application made by representatives of the Atlantic County Freeholders to the State Highway Commission for the approval of specifications, including Warrenite surfacing on the \$693,000 contract for a portion of the White Horse Pike, which has been in court proceedings, was referred to State Engineer Goethals for approval. The portion of the pike in question lies between Absecon, Hammonton and the Seaview County Club, about 26 miles.

Wood Ridge, N. J.—Borough council passed ordinance establishing the grade of Columbia Blvd. from Hackensack St. to 10th St.; providing for the curbing and guttering of Columbia Blvd. and the sidewalking of the same from Hackensack St. to 10th St.; establishing the grade of 2d St. from North St. to Union Ave.; establishing the grade of 10th St. from Highland Ave. to North St.

Wood Ridge, N. J.—Borough council received one bid for the grading of 5th St. and 2d St., and as it was deemed high it was rejected and the proposal ordered readvertised.

Wood Ridge, N. J.—Borough council passed ordinance establishing the grade of Wood Ridge Ave. from 7th St. to its westerly end at the Doelling farm.

Rome, N. Y.—Plans and specifications were ordered for the paving of East Whitesboro St. from James St. to the railroad, and for Canal St. from James to Depeyete St., and for the resurfacing of East Dominick St. from Bouck St. to the Mohawk River bridge, to be presented at the next meeting.

Yonkers, N. Y.—Ordinances approved directing City Engr. to prepare plans and specifications for the resurfacing of So. Broadway from the junction at New Main St. to the south city line; for the widening of the Nepperhan Ave. roadbed from Elm St. to Yonkers Ave., and resurfacing with a permanent pavement of Palmer Ave., between Central Ave. and Bronx River.

Canton, O.—Ordinance approved providing for the issuance and sale general street improvement bonds in the amount of \$19,000 for the purpose of improving Eighth St. N. E., from Belden Ave. N. E. to the East corporation line by grading, paving, laying sidewalks, etc. W. Edgar Jackson, Clerk of Council.

Sacramento, Cal.—Bids received June 4 for constructing state highway in Los Angeles Co., Division VII, Route 23, Section D. State furnishes pipe railing, reinforcing steel, corrugated metal pipe and portland cement; total \$54,069.59.

	Estimate.	Tyron & Brain, Los Angeles.	
Excavation without classifications, 50,000 cu. yds.	\$0.30	\$15,000.00	\$0.30 \$15,000.00
Corrugated metal pipe, 18-in., 295 lin. ft.	.50	147.50	1.50 442.50
Corrugated metal pipe, 24-in., 377 lin. ft.	.75	282.75	1.75 659.75
Cement concrete, Class "A" culverts and manholes, 130 cu. yds.	13.50	1,755.00	15.00 19,500.00
Cement concrete, Class "A" pavement, 13,820 cu. yds.	5.00	69,100.00	7.36 101,715.20
Guard rail, 7,000 lin. ft.	.40	2,800.00	.55 3,850.00
Monuments, 146, each.	.50	73.00	1.50 219.00
Net total		\$89,158.25	
Contingencies		13,873.74	
Totals		\$102,531.99	\$123,836.45

Sacramento, Cal.—Bids opened by State Highway Commission June 4 for highway in Tulare Co., Division VI, Route 4, Section A12. State furnished pipe railing, reinforcing steel, wire mesh reinforcement, corrugated metal pipe, cement, sand and coarse aggregate; cost, \$33,340.

	Estimate.	Leigh G. Garnsey, Los Angeles.		Rogers Bros. Co., Los Angeles.		Geo. S. Benson & Sons, Los Angeles.	
Excavation without classification, 13,400 cu. yds.	\$50.00	\$6,700.00	\$0.69	\$9,246.00	\$0.70	\$93,800.00	\$0.65 \$8,710.00
Moving & resetting property fences, 5,465 lin. ft.	.05	273.25	.20	10,930.00	.15	819.75	.08 437.20
Corrugated metal pipe, 12-in., 260 lin. ft.	.50	130.00	.50	130.00	1.00	260.00	1.00 260.00
Corrugated metal pipe, 18-in., 30 lin. ft.	.80	24.00	.60	18.00	1.00	30.00	1.00 30.00
Corrugated metal pipe, 24-in., 240 lin. ft.	1.00	240.00	.75	180.00	1.00	240.00	1.00 240.00
Cement concrete, Class "A" culverts & manholes, 81 cu. yds.	10.00	810.00	16.00	1,296.00	16.00	1,296.00	15.00 1,215.00
Cement concrete, Class "A" pavement, 5,800 cu. yds.	3.00	1,740.00	4.80	27,840.00	4.90	28,420.00	4.00 23,200.00
Wire mesh reinforcement, 1,800 sq. ft.	.10	180.00	.10	180.00	5.00	90.00	1.00 18.00
Guard rail, 200 lin. ft.	.50	100.00	.60	120.00	1.00	200.00	.80 160.00
Monuments (hauling & setting), 41, each.	.50	20.50	.75	30.75	2.00	82.00	2.00 82.00
Net total		\$25,799.55					
Contingencies		3,869.93					
Totals		\$29,669.48		\$39,955.55		\$40,817.75	\$34,352.20

Canton, O.—Not a bid was received by the State Highway Department for the contract to pave 1.17 mile of the Canton-New Franklin road for about \$38,000 with a monolithic type of brick pavement. Clerk Schick of the county commissioners stated that the cost of the work would be re-estimated and re-advertised and probably awarded within a few weeks.

Cincinnati, O.—Secretary W. T. Foley of the Cincinnati Automobile Club was informed by an official of Richmond, Ky., in Rockcastle county, that Rockcastle and Laurel counties had agreed to build the 6-mile stretch of the Dixie highway which lies between their boundaries.

Cleveland, O.—Resolution adopted to repair brick pavement on Cratham Ave. S. W. W. Thirty-eighth St. and Bailey Ave. S. W.

Cleveland, O.—Resolutions adopted to repair the pavement N. E. Thirty-seventh St. between Superior Ave. and Hoffman Ave., on Duluth Ave. N. E. between Addison Rd. and Gidding's Rd. and on the easterly side of Gidding's road, between Superior Ave. and Wade Park Ave.

Fremont, O.—The First Natl. Bank of Fremont purchased the \$27,300 North Front St. paving bonds. F. C. Klegin, City Aud.

Ironton, O.—County Comrs. passed resolution authorizing the County Aud. to obtain funds for completion of roads known as the Brubaker work.

Kingsston, O.—The Investors' Service Corporation of Chillicothe were the successful bidders for the \$7,000 street improvement (village part) bonds. A. L. Hatcher, Village Clerk.

Springfield, O.—City commission rejected all bids submitted on the paving of High St. from Light St. to Dayton Ave., the commission voted to defer all further efforts to pave the street while prices continue to soar. The bids submitted exceeded the engineer's estimate.

Wapakoneta, O.—The First Natl. Bk. was the successful bidder for the Auglaize County \$7,500 Gracely Rd. improvement bonds. F. W. Langhorst, County Aud.

Miami, Okla.—Ottawa county voters will decide July 3 on the issuance of \$400,000 bonds to construct new roads and improve those now in use.

Condon, Ore.—The city will expend about \$2,000 on improving the city streets this year. Culverts will be constructed in certain streets.

Coquille, Ore.—The result of the bids submitted for the several large highway projects scheduled to have been opened by the Coos County Court, were not received.

McMinnville, Ore.—The Good Roads Association of Yamill county petitioned the county court to prepare 10 or 15 miles of roadbed for hard surfacing this year. The court will comply, requesting the highway commission to take steps to pave the same.

Erie, Pa.—City to test new paving. The material is principally slag bound by two methods, bituminous and water. City Engineer F. G. Lynch directed to prepare specifications.

Erie, Pa.—Council passed Director Kinney's ordinance providing for the paving of Plum St. from 17th to 20th Sts., which is estimated to cost \$6,795. Bids for the work probably will be received the latter part of the month.

Erie, Pa.—Council petitioned for the opening of 22d St. from State to French.

Erie, Pa.—City will receive bids for construction of a sidewalk on the west side of State St. along the canal basin, and on the same day for the paving of Plum St., 17th to 20th and Short St., Sasfras to Chestnut.

Erie, Pa.—Ordinance introduced by Street Director W. D. Kinney, pending passage in the City Council, for the curbing of 29th St., Pennsylvania Ave. to Brandes St. M. J. Henry, City Clerk.

Harrisburg, Pa.—An understanding was reached June 12 between the State Highway Dept. and the authorities of Beaver County whereby an extensive program of road improvement will be undertaken in that county without delay. The Beaver County Comrs. have agreed that all road work to be done in that county shall be on the fifty-fifty basis, and they are preparing to equal any amount to which the county may be entitled by the provisions of any appropriation which may be made by the legislature for such purposes. It was agreed that the first State-aid road to be built shall be the Monaca-Aliquippa highway for which bids will be asked before the end of the month. The second State-aid project for the county is

to commence at New Brighton Borough and extend through Pulaski, Daugherty and New Sewickley Twps., a distance of 20,600 ft. The third State-aid road will be in North Sewickley Twp., coupling up two State-aid roads that are already built. This highway is about 4 miles in length. North Sewickley Twp. has voted two bond issues for the purpose of road improvement. The first State Highway to be reconstructed is on Route 77, extending from Beaver Falls to the Lawrence County line, near Koppel. The second State Highway for which improvement is contemplated is on Route 204, commencing at Beaver Falls and extending towards the Ohio State line to Darlington. Under the pending highway appropriation bill, which is likely to become a law, Beaver County will be entitled to \$76,599.24 for State Highway work; \$23,862.34 for work on State-aid roads and about \$6,000 of the Federal aid funds. The delegation consisted of E. L. Johnson, J. C. Brown and Fred O. Javens, County Comrs.; R. R. McGeorge, of Wampum, and Vincent L. Bradford, of New Brighton. They were accompanied by Senator W. D. Craig and Representatives James R. Gormley and Charles H. Kennedy, of Beaver Co., and Former Judge J. Sharpe Wilson.

Montoursville, Pa.—Borough voted in favor of issuing \$30,000 road improvement bonds. Sam E. Sunderland, Borough Secretary.

Pinegrove, Pa.—Borough of Pinegrove, Schuylkill county, Pa., will shortly receive bids for the laying of approximately 2.8 miles of 10-in. wood pipe. Pipe to be furnished by the borough. Prospective bidders shall communicate with Edgar A. Weimer, engineer, Lebanon, Pa., for particulars.

Bonham, Tex.—Messrs. Matheny, Dixon & Co., of Springfield, purchased the \$40,000 road district No. 17 bonds. No bids received for the \$15,000 road district No. 19 bonds.

Claude, Tex.—County plans to grade roads. E. C. Clayton, Clk.

Dallas, Tex.—City Planning Committee of the Chamber of Commerce and Manufacturers' Association reported to city final completion of arrangements for the widening of two blocks of Harwood St.

Hillsville, Va.—Carroll county will vote Aug. 23 on the question of issuing \$300,000 road improvement bonds.

Staunton, Va.—Plans to construct granolithic sidewalks on portion Frederick St., also Pine Middlebrook Rd. within city limits.

Martinsburg, W. Va.—In paving streets, brick asphalt or macadam, concrete curb and gutter, city will receive bids about September, \$110,000.

Olympia, Wash.—City Council passed ordinance to second reading authorizing construction of a high concrete bridge over the Des Chutes waterway and the paving of the highway to the city limits at a total cost estimated by City Engr. Wood of \$129,476.75.

Vancouver, Wash.—The four miles of river road between the city limits of Vancouver and Love's Pond, which was to have been paved this summer, will not be paved this year, according to a decision by the Clarke County Comrs. The State Highway Engr. insists on having a concrete base with a bitulithic surface, or an entire concrete pavement, which would increase the cost above the amount available.

Madison, Wis.—Council passed resolutions for the issuance of the following coupon bonds: street improvements, \$125,000, and street improvements, \$25,000 bonds.

Winnipeg, Man.—Street Commissioner, City Council, plans asphalt paving roads, at a cost of \$15,000. City Engr., W. P. Brereton.

Winnipeg, Man.—City Council plans construction of a 6-ft. granolithic sidewalk on Gertrude Ave., at a cost of \$1,362, and on Wellington Crescent at a cost of \$2,726. City Engr., W. P. Brereton.

Vancouver, B. C.—At cost of \$1,500, Cowl Harbor will be repaired. City Engineer F. L. Fellowes.

New Glasgow, N. S.—Town Council considering construction of pavement on South St.; cost, \$14,000, and on North Provost St., \$10,500. Town Clk., James Ray.

Batiscan, Que.—Council plans macadam roads costing \$16,000. Clerk, Jules Fugère.

Montreal, Que.—Council plans to widen St. Denis St. to permit the construction of a new subway beneath the tracks of the Canadian Pacific Railway Co.

London, Ont.—City plans to construct an asphaltic concrete pavement on Bathurst St.; cost, \$5,004.37; also a cement walk on Vickers St. City Engr. H. A. Brazier.

Lucan, Ont.—For the improvement of Main St. here Middlesex County Council granted \$1,400. Clerk, Walter L. Gibson.

Owen Sound, Ont.—Town Council intends to construct a concrete curb on First and Second Aves. Clerk, Chas. Gordon.

Petrolia, Ont.—Town Council plans pavement repairs. Chairman, Mayor McRobie.

Peterboro, Ont.—Council will construct sidewalks on the following streets: Chamberlin, Murray, Mark, Dublin and Monaghan road. City Engineer, R. H. Parsons.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Walnut Ridge, Ark.—N. Gregory, Texarkana, by city, building 22 miles road Dist. No. 1, \$110,000.

Santa Barbara, Cal.—Fairchild-Gilmore-Wilton Co., Pacific Electric Building, Los Angeles, \$34,426, by city, paving, grading and curbing portion Bath, Le La Vina and Montecito Sts.

Fort Collins, Colo.—City awarded to J. E. Fisher of the firm of Fisher & Mikesell of Denver for paving of eight blocks in the business district at \$1.32 per sq. yd. Bids were for 30,280 yds. of paving and grading, 2,266 ft. of curb, 3,414 yds. of brick paving and grading, removal of 5,616 sq. yds. of cross walks, construction of 12 manholes, 8 catch-basins and 25 inlets, and use of 690 ft. of oak headers at the ends of the paving.

Rockville, Conn.—National Concrete Co., 149 Greenwich Ave., New Haven, Conn., for sidewalks, curb and gutters for city.

Paris, Ida.—City Council awarded the contract for laying cement walks to *Fred Hauber.

Chicago, Ill.—Board of local improvement, Michael J. Faherty, Pres.; Edward J. Glackin, Secy., June 13 awarded contract for 6-ft. cement sidewalks on several streets and avenues: *Simpson Construction Co., *G. Kehl & Son Co., *Siewert-Callsen Co., *West Englewood Construction & Supply Co., *Bairdow Supply Co., *Albert Graff, *L. Hammar & Son; 6-ft. cinder sidewalks on a system of streets: *Siewert-Callsen Co., *Robert R. Anderson Co., *L. Hammar & Son, *Vander Wagen Bros.

Chicago, Ill.—Contract for the Higgins road, commencing at a point six miles east of Chicago's city limits, and ending at the county line, a distance of 18½ miles, has been awarded to the *Commonwealth Improvement Co. of Chicago. They have placed a sub-contract for a narrow-gauge railway for handling of the aggregate, with the *Orenstein-Arthur Koppel Co. of Chicago. This railroad consists of 8½ miles of Koppel portable track, the necessary Koppel dump cars, etc.

Decatur, Ill.—Board of local improvement awarded to *S. A. Tuttle for the construction of the improvement of the roadway of South Sigel St. from a point 314 ft. south of the south line of West Forrest St. south to the end of the street for the full width of 26 ft. between curbs, by grading, curbing draining and paving.

Moline, Ill.—City awarded *McCarthy Improvement Co. for paving of the 25th St. district at \$37,490.20; also for the construction of the main on 19th St. from 12th to 19th Aves., at \$2,707.90.

Pekin, Ill.—*Jansen & Schaffer, paving Second St., 11,290 yds. monolithic brick and depressed concrete curb. A. B. Lohman, Clk. Board of Local Improvement.

Bicknell, Ind.—Contract has been let to *Val Martin, Thomas Dugger and Henry Dobbs for 20,000 lineal ft. of sidewalk.

Columbus, Ind.—*Chas. Noblitt will construct a gravel road for Bartholomew county at a cost of \$4,350.

Covington, Ind.—*George Galloway of Covington, Ind., has the contract for a Fountain county gravel road, \$11,639.

Indianapolis, Ind.—Indianapolis Board of Public Works let the following contracts: Tremont Ave. from McCarty to Wilkins, cement walks and curb, to *Abel Bros., at \$1.82 per ft.; McLean place, from Capitol to Boulevard place, cement walks and curb, to *Chas. Schwert, at \$1.75 per ft.; 29th St., from 5 ft. west of Parkway to river bridge, asphalt, to

***American Construction Co., Indianapolis, Ind.**—Board of County Commissioners let to the *Northern Construction Co., of Elkhart, at \$137,578, the contract for the brick road which the board proposes to build from Millersville to Ft. Harrison, on what is now prove the road transportation facilities of Ft. Benjamin Harrison. The road will be known as Military drive. It will have a right of way of 100 ft. and a brick surface of 24 ft. It is slightly more than 3 miles in length. If the bond issue of \$200,000, asked by the commissioners, is made, work on the road will begin at once.

Lafayette, Ind.—Contracts for two gravel roads in Wayne Township, Tippecanoe county, were awarded to *Wm. Mahoney, of Lafayette, Ind., at bids of \$3,976 and \$3,989.

LaPorte, Ind.—LaPorte country commissioners let the contract for construction of one gravel road to *Louis Martine, of LaPorte, Ind. No bids were submitted for another road advertised for letting at same meeting.

Shoals, Ind.—*Isaac Williams was the only bidder on the construction of the Shoals and Brooks bridge road in Center township, \$7,575.

Duluth, Minn.—Council awarded to *Olson & Johnson, laying cement walks west of Twelfth Ave. on their bid of 17 cts. a sq. ft. Estimated cost, \$14,651.50.

Duluth, Minn.—City Council awarded *D. H. Clough & Co., for making the necessary changes and improvements in the Farrell road at \$15,491. Contract calls for the grading and graveling of 11th St. from Seventh Ave. east to Eighth Av. east and to the southerly line of the boulevard over the Farrell road.

Fairbury, Neb.—*Roberts Construction Co., Lincoln, by city, paving streets, \$2.27 per sq. yd.

Bogota, N. J.—Borough Council awarded for the grading and macadamizing of three streets in the borough to *M. J. O'Connell of Hackensack, for Leonia at \$14,518.50 and also for Broad St. at a figure of \$3,996. For Beechwood Ave., to *Di Napoli & Allen for \$9,231.

Clementon, N. J.—*Augustus Stutzer, Collingswood, N. J., sidewalks and curb, 14,000 lin. ft. Edw. Arentzen, Clerk Clementon Township, Stratford, N. J.

West Orange, N. J.—For constructing curb and gutters in Ashland Ave., contract awarded *Pelz Construction Co., 207 Market St., Newark, N. J., at \$3,442.44, and in Valley way to *T. G. Schriver, 28 Boyden St., East Orange, N. J., at \$9,210, let by Geo. W. Foster, Town Clerk.

Cohoes, N. Y.—For paving with vitrified brick Park Ave. from Ontario St. southerly to Bridge Ave., *Jas. P. Kelley, at \$35,535. Jas. S. Calkins, Mayor.

North Valhalla, N. Y.—*Wm. F. McCable Contracting Co., Inc., 1 Grove St., White Plains, N. Y., macadam road, \$500,000, North Valhalla, adjoining Kensico cemetery.

Tonawanda, N. Y.—*Gowanda Contracting Co., Inc., Gowanda, N. Y., at \$18,004.40, paving South William, Grove and Simpson Sts. Miss W. Simpson, City Clerk.

Cleveland, O.—Board of Contract approved, contract with the *Cleveland Trinidad Paving Co., the lowest bidders, April 25, for paving and improving Hilgert Dr. S. E., from E. Ninety-fourth St. to Ramona Blvd. S. E., approximately \$22,534.90.

Columbus, O.—State Highway Commission received the following highway bids: C. E. Williams, Grand Rapids, Mich., bid \$54,193.38 on the Cincinnati-Zanesville road. *Wilson & Liles, Gallion, awarded the contract for the Findlay-Kenton road on a bid of \$5,194.20. The Pickaway county section of the Cincinnati-Zanesville highway is to be constructed by *R. L. Row, Circleville, at \$18,973.95. The Atlantic Refining Co. offered the lowest bid on the Springfield-Urbana road at \$2,834.11.

Columbus, O.—Letting of contracts by the Ohio State Highway Department for construction work and maintenance and repair on sections of intercounty highways and roads was announced. The cities and towns named below are in Ohio except where noted. The contracts let and those for which there were no bidders: Adams county, West Union-Sinking road, Meigs township, for constructing culverts, grading roadway and paving with water bound macadam, no bids, Athens county, Logan-Athens road in Dover township, for constructing drain-

age structures, grading roadway and paving with brick on rolled stone foundation. *Eddy & Brannock, Athens, \$21,746.38. Brown county, Ripley-Hillsboro road in Jackson township, for grading roadway, providing necessary drainage structures and paving with water bound macadam, no bids. Coshocton county, New Comerstown-Coshocton road in Tuscarawas and Lafayette townships, for constructing bridges and culverts, grading roadway and paving with water bound macadam and monolithic brick. *T. J. Norman & Son, Canal Dover, \$57,625.15. Fulton county, Toledo-Wauseon road, Swan Creek township, for constructing bridges and culverts, grading roadway and paving with bituminous macadam. *Zeller & Drum, Swanton, natural lake asphalt, \$18,029.84; bituminous macadam asphalt, \$17,064.48. Fairfield county, Cincinnati-Zanesville road in Amanda and Clear Creek townships, for constructing bridges and culverts, grading roadway and paving. *C. E. Williams, Grand Rapids, Mich., \$54,195.38. Fulton county, Toledo-Angola road, in Gorham township, for constructing bridges and culverts, grading roadway and paving with water bound macadam. *Barnes & Tabbert, Rocky Ridge, \$12,889.59. Fulton county, Liberty-Adrian road, in Royaltown township, for grading roadway, building bridges and culverts and paving with water bound macadam. *Gray Bros., Bowling Green, \$11,300. Gallia county, Ohio River road, in Clay township, for constructing bridges and culverts, grading roadway and paving with water bound macadam, no bids. Gallia county, Gallipolis-Jackson road, in Green township, for constructing bridges and culverts, grading roadway and paving with water bound and bituminous macadam, no bids. Hancock county, Findlay-Kenton road, in Madison township, for constructing concrete beam bridge. *Wilson & Liles, Forest, \$5,194.20. Knox county, Mount Vernon-Coshocton road, in Monroe township, for constructing culverts and bridges, grading roadway and paving with water bound macadam. *Mack Gledhill, Gallion, \$22,977.17. Knox county, Mount Vernon-Coshocton road, Monroe township, for constructing reinforced concrete through arch bridge, no bids. Lawrence county, Ohio River road, in Union township, for constructing bridges and culverts, grading roadway and paving, no bids. Mahoning county, Youngstown-Lowellville road, Poland township, for grading roadway and paving with brick, no bids. Mahoning county, Canfield-Poland road, in Poland township, for constructing bridges and culverts, grading roadway and paving with water bound macadam, no bids. Mahoning county, Akron-Youngstown road, in Austintown township, for grading roadway and paving with brick, no bids. Medina county, Barberton-Greenwich road, in Harrisville and Westfield townships, for constructing drainage structures, grading roadway and paving with concrete. *The Crawford Little Co., Elyria, \$16,597.21. Morgan county, McConnellsville-Marietta road, in Morgan and Meigsville townships, for constructing bridges and culverts, grading and paving with brick. *W. H. Quigley, McConnellsville, \$51,832. Pickaway county, Cincinnati-Zanesville road, in Perry township, for constructing bridges and culverts, grading roadway and paving with water bound macadam. *R. L. Row, Circleville, \$18,973.95. Pike county, Portsmouth-Columbus road, in Pee Pee township, for constructing culverts, grading and paving with brick on a concrete foundation, in village of Waverly. *Bolin & Wilt, Washington C. H., \$30,535.10. Putnam county, Kalida-Lima road, in Greensburg township, for grading roadway and building bridges and culverts, no bids. Scioto county, Portsmouth-Lucasville road, in Washington township, for constructing bridges and culverts, grading roadway and paving, no bids. Stark county, Canton-New Franklin road, in Osnaburg township, constructing bridges and culverts, grading roadways and paving with brick, no bids. Trumbull county, Ravenna-Warren road, Warren township, by constructing Duck Creek bridge (replacing superstructure complete). *George Stein, Niles, \$2,645.96. Trumbull county, Niles-Ashtabula road, in Mecca and Green townships, for constructing bridges and culverts, grading roadway and paving with plain concrete, no bids. Vinton county, McArthur-Athens road in Madison township, for constructing concrete pavement. *Kuhner & King, McArthur, \$5,349.05. Washington county, Hockingport-Powhattan road, in Belore township, for shaping roadway and paving with concrete (plain

and reinforced). *Straw & Huber, Paulding, \$21,542.30. Washington county, Marietta-McConnellsville road, in Adams township, for constructing bridges and culverts and paving with plain concrete. *McElfresh, Danford & Co., Caldwell, \$19,579.87. Williams county, Bryan-Edgerton road, in St. Joseph township, for constructing bridges and culverts, grading roadway and paving. *Westrick & Coady, Holgate, B. Mac., \$54,803.59; Bit. Mac., Sec. 6.1, \$65,984.31; Bit. Mac., Sec. 6.9, \$63,563.09. Ashland county, surface treating with bituminous material, Ashland-Loudonville road, Ashland-Oberlin road. *The Barrett Co., Cleveland, \$3,028.96. Clark county, surface treating with hot oil, Springfield-Urbana road, National road. *The Atlantic Refining Co., Columbus, \$2,834.11. Defiance county, Archbold-Defiance road, Noble township, by surface treating with tar. *The Barrett Co., Cleveland, \$2,159.82. Erie county, Cleveland-Sandusky road, Huron township, for surface treating with bituminous material. *Edward F. Huffman, Castalia, \$1,250. Erie county, Cleveland-Sandusky road, Perkins township, for surface treating with tar. *Edward F. Huffman, Castalia, \$705. Fayette county, Washington-Bloomington road, in Union and Paint townships, surface treatment. *The Atlantic Refining Co., Columbus, \$3,611. Franklin county, for surface treating with asphalt. *The Atlantic Refining Co., Columbus, \$5,990.98. Fulton county, surface treatment with cold oil. *The Atlantic Refining Co., Columbus, \$1,535.69. Fulton county, Toledo-Angola road, by surface treating with tar. *The Barrett Co., Cleveland, \$1,969.35. Hancock county, surface treating with tar. *The Barrett Co., Cleveland, \$4,247.23. Hardin county, surface treating with hot oil, Marysville-Kenton road, Findlay-Genton road. *The Atlantic Refining Co., Columbus, \$2,735.46. Harrison county, Bridgeport-Cadiz road, Short Creek township, for repaving shoulders and ditches, repaving old roadbed and resurfacing with water bound macadam, no bids. Henry county, Holgate-Kiefersville road, by surface treating with tar. *The Barrett Co., Cleveland, \$1,823.53. Lake county, Painesville-Warren road, in Leroy and Concord townships, for scarifying the old road, widening to 14 ft., adding new stone to base and putting on a 3-in. top course of asphalt macadam. *The J. C. Devine Co., Alliance, \$15,470.45. Lawrence county, for surface treating with tar. *The Barrett Co., Cleveland, \$4,040.85. Lorain county, Oberlin-Norwalk road, in Camden and Henrietta townships, for constructing drainage structures, grading roadway and paving with asphalt macadam. *Hart & Kamp, Elyria, asphalt macadam, \$14,839.11; *Elyria Construction Co., tar macadam, \$14,069.20. Lorain county, Oberlin-Elyria road, in Carlisle township, for constructing drainage structures, grading roadway and paving with bituminous macadam. *C. E. Williams, Grand Rapids, Mich., \$16,847.57. Medina county, Cleveland-Wooster road, in Medina township, for grading roadway and paving with bituminous macadam. *George S. Mellert, Medina, \$27,821.02; *Kennedy-Werner Co., Medina, \$26,137.32. Mercer county, St. Marys-Fort Wayne road, in Dublin township, by surface treating with tar, no bids. Paulding county, surface treating with cold oil. *The Atlantic Refining Co., Columbus, \$2,361.62. Preble county, surfacing treating with hot oil Dayton-Indianapolis road, Hamilton-Eaton road. *H. W. Curry & Co., Eaton, \$4,333.10. Sandusky county, for surface treating with cold oil. *The Atlantic Refining Co., Columbus, \$3,607.12. Sandusky county, Fremont-Bellevue road, in Green Creek township, for surface treating with tar. *The Barrett Co., Cleveland, \$2,862.54. Sandusky county, surface treating with tar. *The Barrett Co., Cleveland, \$5,401.16. Sandusky county, Fremont-Perysburg road, in Sandusky township, by surface treating with cold oil. *The Atlantic Refining Co., Columbus, \$608. Shelby county, Piqua-St. Marys road, in Lorain township, for repaving the substructure and the superstructure of a bridge. *Boyer & Paul, Botkins, \$1,283.45. Summit county, macadam portion of the Akron-Medina road, in Portage and Copley townships, for surface treating with bituminous material. *The Barrett Co., Cleveland, \$3,545.10. Trumbull county, Warren-Meadville road in Johnston township, for constructing and culverts, grading roadway and paving with bituminous macadam, no bids. William county, surface treating with tar. *The Barrett Co., Cleveland, \$5,306.93.

Denance, O.—F. Newill, by county commissioners, improving Auburn-Denance road.

Paulding, O.—For paving Wurm, Fitzwater and May roads, contract awarded *J. S. Blosser, Cloverdale, O., and Floyd Wells, Continental, O., let by A. M. Armstrong, Aud. Paulding County.

Springfield, O.—Competition bids in the paving of West Hyn St. from Light St. to Dayton Ave., above engineer's estimate. The bidders with the respective figures of each were as follows: M. J. Hannon, Trinidad lake asphalt, \$40,144; Texico or Aztec, \$39,314; J. J. McHugh, Trinidad, \$40,144; Aztec or Texico, \$39,144; Caffrey and Cooney, Trinidad, \$40,723 and Texico or Aztec, \$39,893. The low bids on asphaltic concrete were also submitted by Hannon and McHugh, the figures being \$35,496 from each. The engineer's estimate on the work was \$37,650.

Steubenville, O.—H. M. Bates, Steubenville, by Ross Park Realty Co., improving property by laying brick pavement, concrete base, grout filler, etc., \$35,341.

Harrisburg, Pa.—Second Deputy State Highway Commissioner George H. Biles opened bids June 12 for the construction of improved roads in these counties. Dauphin county road extends through Oberlin a distance of 1,270 ft. to be of vitrified block on a concrete base and is to be 26-ft. wide. The bids were as follows: F. J. Rely, Lancaster, Pa., \$18,886.65; Stucker Brothers Construction Co., Harrisburg, \$18,192.15. Clarion county road is located in Clarion and Paint Townships, on State Highway Route Number 65. It commences at the west borough line of Clarion and extends to Breneman's Corners, a distance of 14,128 ft., is to be 16 ft. wide and of vitrified block on a concrete base. M. J. Scanlan, of New Castle, Pa., bid \$106,167.00. Greene county road is in Oil City, Pa.—Hinderlitter & Pierce, for paving in School St. and Linden Alley; R. Mackenzie, City Controller; W. W. Holt, Clk.

Seranton, Pa.—County Commrs. awarded a contract to the *Hasting Co., of New York, for resurfacing a 1,000-ft. stretch of the county road with asphalt blocks. Center Township and extends from a bridge over Ten Mile Creek, near Rogersville, southwesterly to the Hagus Creek and Middlebourn Rd., a distance of 4,836 ft., over State Highway Route 111. This pavement is to be of reinforced concrete, 14 to 16 ft. wide. The bidders were: Robert Swan Jr. Co., Pittsburgh, \$48,816.00; Reed, Yoders & Moore, Waynesburg, \$32,300.82; John W. Hallam, Washington, Pa., \$28,732.00. No bids were received for the proposed road construction in Cambria county and for that proposed in Allegheny and Washington counties. Bids will be scheduled and announcement will be made later of the action taken by the department.

Olympia, Mont.—The State Highway Board awarded the contract for constructing a concrete overhead crossing on the Pacific highway at Nisqually, where the state road crosses the Northern Pacific tracks, to *W. J. Murphy of Tacoma, \$28,440; for clearing, grading, draining and paving about three and a half miles of the Pacific highway from Olympia to St. Clair, on the Pacific highway, the *Independent Asphalt Paving Co., of Seattle, \$62,581.16.

Green Bay, Wis.—McDonald & Schaefer, Green Bay, were awarded a contract by the city council to pave, with concrete, the road leading to the approaches of Mason St. bridge over Fox River, for \$6,890. W. L. Kerr, City Clerk.

Sandwich, Ont.—Town Council awarded *Crick Contracting Co., McDougall St., Windsor, for reinforced concrete pavement costing \$14,600.

St. Pierre, Que.—Geo Madden, 822 St. Valler St., Quebec, by Municipal Council for gravel roads costing \$32,500.

Toronto, Ont.—Foley & Gleason, Ottawa, have been awarded contract upon a percentage basis for the construction of 3 miles of asphaltic penetration roads at Leaside.

SEWERAGE.

Berkeley, Cal.—See "Streets and Roads."

Conrad, Ia.—See "Water Supply."

Sioux City, Ia.—Council passed resolutions ordering that all gas, sewers, heat and water connections be made on prop-

erties abutting the proposed pavings of West Twenty-first, Twenty-first, West Thirteenth, South Howard, Tenth, Eighteenth, Thirteenth, McDonald, Twenty-fifth and Heights Sts.

Sioux City, Ia.—Council granted petition for a small sanitary sewer in Jones St. from a point 90 feet north of Twenty-seventh St. to Twenty-eighth St.

Frankfort, Ky.—See "Streets & Roads."

Frankfort, Ky.—City Council instructed the city engineer and the street committee to secure estimates on the cost of constructing a sewer on Steele St.; also for a sewer at High St. at the foot of the East Main St. hill.

Hagerstown, Md.—Sewerage Commission considered the advisability of acquiring by condemnation the property needed on Willow Lane and also the Holzapfel lands and other lands to Jefferson St., for construction of the sewerage.

Fall River, Mass.—H. R. Barrows, engineer, 6 Beacon St., Boston, preparing plans for city improving sewerage system.

Menominee, Mich.—City Council accepted the plan for the new sewer district as prepared by City Engineer Hasley and set June 25 to hear suggestions or objections, cost will be about \$15,000.

Caledonia, Minn.—Contract for installing sewerage system will soon be let.

Duluth, Minn.—Council ordered the construction of a sanitary sewer in Otsego St. from 54th to 57th Aves. east at an estimated cost of \$473.99, and the grading of Ivanhoe St. between 51st and 53d Aves. east, 20 ft. wide. The engineer was directed to make an estimate on the latter.

Duluth, Minn.—Council petitioned for a sanitary sewer to be constructed in 39th Ave. west from the southerly line of Whitman Park addition to Eighth St.

Duluth, Minn.—Council petitioned for a sanitary sewer to be constructed on the southerly side of Second St. from a point 125 ft. west of Tenth Ave. west to a connection with the sanitary sewer now constructed in Summit Ave.

Remer, Minn.—See "Water Supply."

Lambert, Miss.—voted bonds to install sewerage system.

Bozeman, Mont.—See Water supply.

Lordsburg, N. M.—Council plans to install sewerage system.

Brooklyn, N. Y.—Newtown local board approved petitions authorizing the construction of a sewer in Hazen St. from Riker Ave. to Flushing Ave.; Ditmars Ave. from Hazen St. to 17th Ave., and in 17th, 18th and 19th Aves. from Ditmars Ave. to Flushing Ave. in the Astoria and Woodside sections; estimated cost, \$75,500.

Larchmont, N. Y.—J. H. Gregory, engineer, 170 Broadway, New York City, has been engaged by board of trustees to prepare plans sewage pumping station and sewage force main.

Rome, N. Y.—Plans were ordered for a storm water sewer in West Liberty St. from Frederick St. to Dextater Ave., and Court St., to relieve the upper section of these streets from the storm water.

Canton, O.—Ordinance approved to proceed with the construction of a sanitary sewer in Bonnot Place N. E., from first alley east of Gross Ave. to St. Elmo Ave. N. E., and St. Elmo Ave. N. E., from 15th St. N. E. to 17th St. N. E., same being in and a part of Sewer Dist. No. 1. Chas. A. Stolberg, Mayor.

Canton, O.—Council has decided to have submitted again to the voters at the August primaries a bond issue of \$210,000 for the construction of the east and west intercepting sanitary sewers which have been ordered built by the State Health Board.

Marion, O.—Plans storm water sewer in Mound St. from point south of Sugar St.

McKinney, Texas.—The McKinney Sewerage Co. is preparing to build a modern sewerage disposal plant.

Ogden, Utah.—City engineer will present computations to City Commission for the building of a sewer in the Third Ward of this city and a general discussion will be had to determine whether, in the face of the protests already received, the city has the power to build the new drainage system.

Weston, W. Va.—Sum of \$45,000 has been appropriated for sewage disposal plant at state asylum by state legislature.

Appleton, Wis.—Plans are being prepared for sanitary sewer in portion Durkee St. M. Williams, city clerk.

Green Bay, Wis.—Council petitioned to extend sewer on Dousman St. west to Oneida St.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Chicago, Ill.—Board of local improvements, Michael J. Faherty, President; Edward J. Glackin, Secretary, awarded contracts June 13 for tile pipe sewer with brick manholes and brick catch basins and the tile pipe drains in several streets and avenues, as follows: *Henry Tiel, *Michael Pontarelli, *George Pontarelli, *Simon Ryan, *Carmen Roberts.

Anderson, Ind.—Minnick Construction Co., New Castle, \$15,990, by city, sewer in East Lynn St.

Indianapolis, Ind.—Board of Public Works let the following contracts: Local sewer in Julian Ave. and Bancroft Ave., from Emerson to a point 19½ ft. north of Railroad St., to Columbia Constr. Co. at \$1.69 per ft. Local sewer in Broadway from Fifty-first to Fifty-second St., to *Eastern Constr. Co., at \$2.28 per ft.

Mishawaka, Ind.—Contract for installing a sewer on Kernhart Ave. from Lincoln Highway to Linden Ave. was awarded to *Staples & Ackerman.

Sioux City, Ia.—J. F. Delvin was awarded the contract for the construction of a sanitary sewer in Nebraska St. from Thirty-second to Thirty-fourth Sts. *W. B. Carter for the construction of a storm water sewer in Pearl St. from Seventh St. to Perry creek.

Swampscott, Mass.—Felix D'Agness for sewer in Lodge Rd., let by Saml. M. Kehoe, Geo. D. R. Durkee and Harold G. Enholm, Water & Sewerage Board.

Duluth, Minn.—Council awarded to the *Duluth Builders' Supply Co. for furnishing sewer construction material for the entire city, except New Duluth, on its bid of \$15,070.30.

Duluth, Minn.—Council awarded to the *Northern Lumber & Coal Co. for furnishing sewer construction material in the New Duluth district on its bid of \$3,193.03.

Tremont, Neb.—*J. W. Andrews, by city, installing sewers in 15th and 19th Sts.

Newark, N. J.—Six bids on the Kearny-Harrison branch intercepting sewer were received by the Passaic Valley Sewerage Commission. They ranged from \$104,662.25. All were within the estimates made by the commission's engineers. Final consideration was postponed.

Schenectady, N. Y.—Bd. of Contract & Supply awarded the contract to lay a 15-in. sewer main in Eastern Ave., from the plant of the International Milk Products Co. to Nott Terrace, to *Allis B. Edgar, for \$825; also authorized the execution of a contract between the state and the city for removing the Washington Ave. Canal Bridge, filling the canal, straightening the street and lowering the grade. Work on the improvement is expected to be started in about a month.

Cleveland, O.—Board of contract approved contract with *Brookside Construction Co., amounting to approximately \$860,000, covering the construction of a sewer in E. 104th St. from Sandusky Ave. S. E. to 320 ft. northerly.

Cleveland, O.—Board of Contract with *Continental Realty Co., amounting to approximately \$800.00, covering the construction of a sewer in Linndale Ave. S. W., from West Blvd. to W. 105th St., and construction on a sewer in Linndale Ave. S. W., from Bosworth Rd. S. W. to W. 105th St., amounting to approximately \$999.00.

Swissvale, Pa.—For 480 ft. 8-in. sewer in Climax St., contract let to *John P. Dilson, Edgewood, Pa.; Frease & Sperling, Engrs., Wilkensburg, Pa.

Titusville, Pa.—City awarded *W. C. Alcorn sewer W. Oak St., at \$122.10. W. M. Dame, City Clk.

Sheboygan, Wis.—*J. J. Koepsell Co., Sheboygan, by city, sewer.

Whitefish Bay, Wis.—*J. T. Blake, Madison, \$2.90 per lin ft., by village, sewers.

WATER SUPPLY.

Greeley, Colo.—Council plans to purchase 1 ml. of 20-in. steel water pipe.

Rosemont, Colo.—Plans are being prepared for reservoir for Myron Stratton Home; about \$100,000.

Wiley, Colo.—Town considering plans for drilling of well and storage reservoir.

Wilmington, Del.—City will sell to install water system \$300,000 bonds. E. M. Hoopes, Jr., supt.
Macon, Ga.—Plans to extend water mains from East Macon to cantonments at Holley Bluff, about \$60,000. C. F. Williamson, chairman.
Savannah, Ga.—City contemplates a \$500,000 bond issue for rebuilding the water work system.
Kendrick, Ida.—The Kendrick State Bank purchased the \$5,000 water works system bonds. E. A. Randall, Village Clk.
Conrad, Ia.—City sold \$15,000 bonds for water works and sewerage system.
Kensett, Ia.—Town contemplates installation of a water works system.
Union, Ia.—City plans to improve water works.
La Crosse, Kan.—A \$30,000 bond issue has been sold to install waterworks; plans being prepared by W. R. Rollins & Co., Engrs., 209 Railway Exchange Bldg., Kansas City.
Danvers, Mass.—City contemplates laying 2,000 ft. 12-in. and 3,000 ft. 6-in. C. I. pipe, 100 services, 12 fire hydrants and 25 gates. Henry Newhall, Supt.
Grayling, Mich.—Purchase of 1½ h. p. gasoline engine and pump to replace present system of water, supply at Crawford Co. infirmary authorized by Bond supervisors.
Lake Linden, Mich.—Council discussed

plans for improving water works system.
Akeley, Minn.—For installation of water works a \$10,000 bond issue has been sold.
Albert Lea, Minn.—A representative of the Combustion Engineering Co., of New York City, introduced in Council an automatic stoker which he proposed to install under the boilers at the city water works plant. The device, installed and ready for operation, would cost the city in the neighborhood of \$6,000, but, according to his estimate, would save the city between \$1,400 and \$2,000 in fuel. No definite action was taken in the matter.
Duluth, Minn.—City will extend water and gas mains for 2 miles from 84th Ave. west to the intersection of Commonwealth and Zimmerly Aves. this summer. Cost, approximately \$50,000.
Duluth, Minn.—City Commission appropriated \$45,000 for the purchase of a 25,000,000-gallon electrically operated centrifugal pump for the water and light department at the Lakewood pumping station.
Remer, Minn.—City sold June 9 a \$10,000 bond issue for water work and \$3,500 for sewers.
Biloxi, Miss.—See "Streets and Roads."
Bozeman, Mont.—City has acquired a tract of several acres of ground for park

at \$3,500; water and sewer connections will be made.
Albuquerque, N. M.—Contract has been signed with the local water company for the purchase of works system.
Asbury Park, N. J.—City plans to install water mains in seven streets. R. Bartley, Jr., supt.
Dover, N. J.—Aldermen plan to improve gravity water system, about \$17,582.
Jamestown, N. Y.—Bids will be called shortly for water works improvements.
Kingston, N. Y.—The Ulster County Savings Institution of Kingston purchased the \$30,000 water bonds. Ward B. Everett, City Treasurer.
Rome, N. Y.—The water and sewer board will be asked to lower the water main in South Jay St.
Hazen, N. D.—Village clerk receiving bids for the installation of a water works system.
Langdon, N. D.—Engineer T. R. Arnold, of Great Falls, Mont., has prepared plans for a new water work system.
Bonesteel, S. D.—A special election has been called for June 28 to vote upon the question of issuing bonds in the amount of \$15,000 for an enlargement of the water works system and \$14,000 for the installing of a municipal electric light plant.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Pa.	Crafton Boro...	7.30 p.m., June 26..	Grading, curbing and paving.....	M. C. Millholland, Boro. Engr., 309 4th Ave., Pittsburgh, Pa.
Ill.	Springfield	11 a.m., June 27..	Earth road construction.....	W. W. Marr, Ch. State Hwy. Engr.
Wis.	Antigo	June 28..	Cement walks on several streets.....	G. O. Palmiter, Town Clerk.
Neb.	Red Cloud	June 29..	Paving six blocks.....	City Council.
Minn.	St. Paul	10.30 a.m., July 2..	Grading and improving a number of streets.....	H. W. Austin, Pur. Agt.
O.	Ashtabula	1 p.m., July 2..	Brick road improvements.....	B. E. Brainard, Clerk, Board of Co. Comrs.
Cal.	San Jose	11 a.m., July 2..	Street improvements	H. A. Pfister, Clerk, Board of Supervisors.
Ind.	Fowler	July 2..	Grading, draining and graveling highway.....	Warren Mankey, Benton Co. Audr.
Wash.	Waterville	2 p.m., July 2..	Grading, draining and surfacing with gravel 2.1 miles of road	Robt. F. Foster, Douglas Co. Engr.
O.	Columbus	noon, July 6..	Grading, draining and curbing with asphalt or asphaltic concrete, also with brick.....	G. A. Borden, Dir. Pub. Serv.
Ark.	McGehee	July 10..	Constructing 160 miles of highway.....	Ford & MacCrea, Engrs., Gazette Bldg., Little Rock, Ark.
SEWERAGE.				
O.	Jacksontown	June 30..	Sewage disposal plant and sewerage system connected with school	L. A. Osborn, Pres., Board of Education.
Minn.	St. Paul.....	10.30 a.m., July 2..	Constructing force main sewer.....	H. W. Austin, Pur. Agt.
WATER SUPPLY.				
Ill.	Joliet	10 a.m., June 25..	Laying water mains.....	Board of Local Impvts.
D. C.	Washington.....	June 25..	2,875 ft. 4-inch c. l. pipe at Naval Station, Radio, Va. (Refer to specifications No. 2432).....	Bureau of Yards & Docks, Navy Dept., Wash., D. C.
N. D.	Anamoose	June 25..	Water works system.....	F. J. Funke, Village Clerk.
Ill.	Farmington	8 p.m., July 2..	Improving and extending water works system, to include deep well, pumping station, steel tower, or concrete standpipe, deep well pump, pipe valves, etc.....	G. F. Hubbard, City Clerk.
N. D.	Towner	July 2..	Reservoir construction	A. M. Berget, City Audr.
N. Y.	Cohoes	2 p.m., July 13..	Two motor generators and other electrical equipment for pumping station	Board of Contract & Supply.
FIRE EQUIPMENT.				
Ia.	Oelwein	8 p.m., June 25..	1,000 ft. fire hose.....	City Clerk.
Pa.	East Pittsburgh	June 25..	Motor apparatus equipped with pump.....	Raymond O'Rourke, Secy. of Council.
Wis.	Green Bay.....	10 a.m., June 25..	1,000 ft. cotton, rubber-lined hose.....	W. L. Kerr, City Clerk.
N. J.	West New York.....	8 p.m., June 26..	1,500 ft. double jacketed rubber lined hose; also fire alarm boxes	Town Clerk.
Minn.	Virginia	2 p.m., July 2..	1,000 ft. of hose.....	A. E. Bickford, Secy., Board of Fire & Police Comrs.
BRIDGES.				
Cal.	San Jose	11 a.m., July 2..	Constructing reinforced concrete bridges and culverts.....	H. A. Pfister, Clerk, Board of Supervisors.
Ind.	Kokomo	10 a.m., July 6..	Bridge repairs	W. L. Benson, Howard Co. Audr.
Ga.	Chatsworth	July 9..	Constructing steel bridge.....	Co. Clerk, Murray Co.
MISCELLANEOUS.				
O.	Ashtabula	1 p.m., June 29..	One 2-ton self-dumping motor truck.....	J. W. Prine, City Mgr.

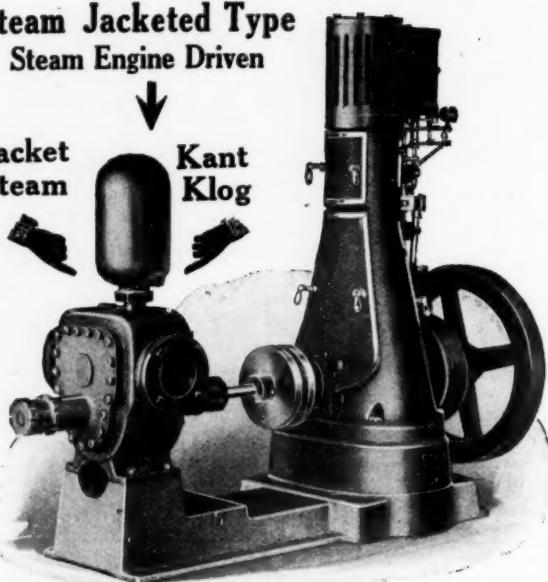
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STREETS AND ROADS.

Chico, Cal.—Chico Business Men's association discussed launching in the near future for the voting of a bond issue of from \$1,000,000 to \$1,500,000 for the construction of a system of permanent roads throughout the county.

Springfield, Ill.—City engineer has drawn plans for the paving of four sides of the public square and estimates are being made to cover the cost of the improvement. City Council has agreed and the present brick pavement shall be replaced by creosoted wood block.

New Bedford, Mass.—Council ordered macadam and curbing on Hall St. from Rockland St. northerly.

Flint, Mich.—Council granted petition for a sidewalk on the west side of Wolcott St., and for a sidewalk on both sides of Durand St.

Marquette, Mich.—City Commission ordered the extension of Specular St. to the Piqua handle plant by laying of 3,319 ft. of macadam.

St. Cloud, Minn.—Stearns county presented with a proposition for consideration from Hon. Milo Young of Morrison county for a highway from St. Cloud by way of Five Points and St. Stephen designated as a state road, and to connect with a road a mile west of Opoil with the road to Bowlus, connecting at the county line. This would make a more direct road to Holdingford and west of Little Falls.

Fredericksburg, O.—Village Clerk J. P. Cramer receiving bids July 7; \$7,500 street improvement bonds.

Hamilton, O.—Clerk Butler, County Commissioner W. W. Crawford, receiving bids June 27 for \$15,000 road improvement bonds.

Ironton, O.—County Auditor Crawford informed by the State Highway Commission that Chief Engineer Graham of the department was directed to proceed with the work of completing the Brubaker state road contract below Proctorville.

McConnellsville, O.—Village Clerk C. C. Morgan receiving bids July 2 for \$8,000 street improvement bonds.

Russell, O.—Council passed resolution for the paving of number of streets.

Eugene, Ore.—Council passed the ordinance providing for the improvement of Ferry St. between Eighth Ave. and the Southern Pacific right-of-way with a pavement consisting of a six-inch concrete base and an asphalt wearing surface of an inch and a half. The next step will be to advertise for bids.

Donna, Tex.—Plans are being made for improving city streets, cost about \$10,000.

Quanah, Tex.—The Business League here has just completed arrangements to construct the Quanah Parker highway, extending from points in Oklahoma through Quanah to El Paso.

Pullman, Wis.—The city council has placed its stamp of approval on the proposed paving of some 8,000 sq. yds. of highway in College Park addition, and will advertise for bids for the work. The council will also extend the water system in the addition to serve all residents.

South Bend, Wash.—Pacific county voted a \$250,000 bond issue for constructing 45 miles of road. The improvements as planned by Chas. S. B. Henry, county engineer, and covered under the bond issue, are as follows: National Park Highway, Lebam easterly, $\frac{3}{4}$ mile, 8-ft. concrete pavement, including $\frac{1}{4}$ mile of 16-ft. concrete pavement in Labam, grading and culverts. Cost, \$11,739. National Park Highway, Lebam to Naplee (except 0.75 mile Channel Change Hill) and including grading and culverts. Cost, \$18,100. National Park Highway, Naplee to Stauffer Bridge, 2.1 miles, 8-ft. concrete pavement, grading and culverts. Cost, \$18,698. National Park Highway, Stauffer Bridge to Lilly Bridge, 2.6 miles, 8-ft. concrete pavement, grading and culverts. Cost, \$19,082. National Park Highway, Lilly Bridge to Glessey's Crossing, 2.5 miles, 8-ft. concrete pavement, including $\frac{1}{4}$ mile of 16 ft. concrete pavement in Menlo, grading and culverts. Cost, \$24,091. National Park Highway, East Raymond to Raymond, 1.5 miles, 16-ft. concrete pavement, grading and culverts. Cost, \$26,939. Concrete bridge on National Park Highway. Cost, \$10,500. Concrete Bridge over Green Creek. Cost, \$3,150. Concrete Bridge over Willapa River at Lebam. Cost, \$5,000. National

Park Highway, Nasel River to Bear River, 8 miles, clearing, grubbing, grading and draining. National Park Highway, Palix River to Nema, 9 miles, 10-ft. plank and turnouts, or graveling. Cost, \$25,810. National Park Highway, Nema to Nasel River, 7 miles, 10-ft. plank and turnouts, or graveling. Cost, \$20,074. National Park Highway, Nasel River to Bear River, 8 miles, 10-ft. plank and turnouts, or graveling. Cost, \$22,942. National Park Highway, Bear River, westerly, $2\frac{1}{2}$ miles, plank 10-ft. wide and turnouts, or graveling. Cost, \$7,633. National Park Highway, relocation over Palix Hill, and widening Warren Dike. Cost, \$3,738.

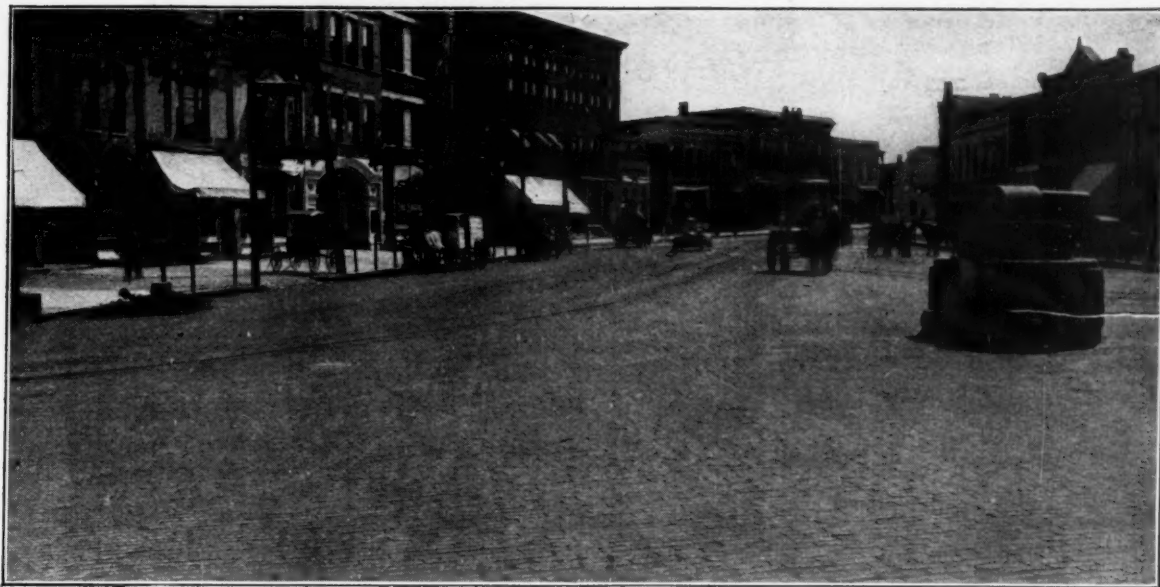
SEWERAGE.

Sacramento, Cal.—City passed resolution for constructing a 12-in. vitrified ironstone pipe sewer in alley north of "T" St. For further information address Supt. of Sts. J. C. Nurse.

Miami, Fla.—City Clerk W. B. Moore receiving bids July 5, 7.30 p. m. for the following bonds: Sewer, \$75,000; hospital, \$50,000; dock and warehouses, \$50,000; municipal railway, \$30,000; park, \$25,000; ship canal and turning basin, \$20,000; 12th St. bridge, \$5,000; Ave. D bridge, \$5,000.

Moline, Ill.—East Moline city officials are at work on plans for a comprehensive storm drain system which will cost approximately \$250,000. Plans and estimates will soon be ready for consideration of the City Council.

Minneapolis, Minn.—The ways and means committee of the City Council have prepared to readvertise bond issues for the park board, river terminals, city workhouse, hospital, armory, appraisal and permanent improvement fund, offered at bond sale for which no bids were received. Bids for \$1,177,000 of a total of \$1,742,000 bonds offered were accepted. Issues for schools, sewers and bridges were taken jointly by the Harris Trust & Savings Co., Chicago, and Estabrook & Co., and R. L. Day, Boston.



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Etna, Pa.—Plans have been approved by the Pennsylvania Department of Health for chemical germicide apparatus to be installed as a temporary measure and requiring plan for permanent improvements to the water works.

Mountville, Pa.—The State Highway Department of Health have approved plans for new reinforced concrete storage reservoir and reinforced concrete roof on existing reservoir.

Tarentum, Pa.—Plans have been approved for auxiliary sedimentation basin for construction of the municipal water filtration plant.

Lebanon, Tenn.—Citizens may vote shortly on a \$50,000 bond issue for water works system.

Aberdeen, Wash.—City plans to expend \$100,000 for general municipal improvement, to include additional water mains.

Kingfisher, Wash.—Plans water work improvements.

Pullman, Wash.—See "Streets and Roads."

Mayville, Wis.—For the erection of a 100,000-gallon steel tank and tower, bids are to be invited.

Stanley, Wis.—City contemplates issuing \$10,000 water improvement bonds.

Basin, Wyo.—City contemplates extending water and electric light system. G. B. Morrison, supt.

Burns, Wyo.—City sold to install water and light plant a \$17,000 bond.

Edmonton, Alta.—Four 12,000 ft. of 6 in. cast-iron pipe, Class C, tenders are to be called. Acting City Engr., A. W. Haddow.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Macon, Ga.—Board of water commissioners awarded a contract for a new high service pump to help supply the "high" districts in the city. The new pump will have a capacity of 7,500,000 gallons for 24 hours' service. *Owens-Hoover-Rancher Co., of the Hamilton-Carliss Engine Works, of Hamilton, O. Cost to the city is \$32,500.

Chicago, Ill.—Board of local improvements, Michael J. Faherty, President, Edward J. Glackin, Secretary, awarded contracts June 13 for water service pipes in several streets and avenues, as follows: *James Renn, *Daniel Hardin, *Washington Plumbing & Heating Co.; water service pipes, including brass taps and stopcocks and spiral cast iron shut-off boxes in a system of streets, *David Walsh.

Joliet, Ill.—Bd. of Local Improvements awarded June 11 to *Curtis & Tindall for the construction of a water main in Third Ave.

Joliet, Ill.—Bd. of Local Improvements, Frank W. Wheeler, Clk., June 11 awarded *Curtis & Tindall for the construction of a water main in Wilson St.

Brooklyn, N. Y.—Low bid received furnishing, delivering and laying water mains and appurtenances in Atlantic, Highland, Manhattan, Neptune, Poplar, Seagate and Surf Aves., in grounds of Seagate Assn., from Murphy Bros., 2624 Cropsey Ave., Brooklyn, \$24,901. Dept. water supply, gas and electricity, Municipal Building, New York City.

Bradford, O.—*H. E. Miller, 165½ North High St., Columbus, by city, improving water works, \$14,445.

Aurora, Ont.—G. E. Hartley, Oil Springs, by town council, for artesian well.

Sandwich, Ont.—See "Sewerage."

Edmundson, N. B.—Contract has been awarded by the Fraser, Ltd., pulp and paper mill, to the *Bawden Pump Co., Toronto, for 14 centrifugal pumps of from 1 to 4 M.G. daily capacity, against 15-ft. to 80-ft. head, also for a large compound boiler feed pump operating against 225-lbs. pressure.

LIGHTING AND POWER.

Albert Lea, Minn.—City Council appointed a committee of three to investi-

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MUNICIPAL JOURNAL

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NEW YORK

gate the proposition of a municipal electric light plant for city.

Basking Ridge, N. J.—Voters will decide soon on the proposal to appropriate funds for an electric lighting system for the township.

Supply, Okla.—Voters will decide June 25 on the question of issuing \$6,000 electric light plant bonds.

Kincardine, Ont.—Town Council plans changing the present lighting system to a hydro-electric power system.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Lansing, Mich.—The contract for lighting the state capitol for the next two years has been awarded to the *Lansing municipal lighting plant.

FIRE EQUIPMENT.

Bliddeford, Me.—Fire committee voted to recommend the purchase of 1,000 ft. of hose for the fire department.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Danbury, Conn.—Council authorized the purchase of a Pope-Hartford automobile which will be converted into a motor hose wagon for use at the Boughton St. station.

BRIDGES.

Norrililton, Ark.—Conway County Bridge District, Chairman Board of Commissioners J. J. Scroggins, receiving bids June 29 for \$150,000 bridge bonds.

Miami, Fla.—See "Sewerage."
Fort Wayne, Ind.—Allen Co. has appropriated \$20,000 for bridge building.

Waterloo, Ia.—City Council ordered a reinforced concrete bridge, to cost approximately \$30,000, built across Black Hawk Creek leading into Hagerman addition. Plans and specifications are to be prepared at once by the City Engr., and work on the structure will be started as soon as possible.

City Planning, Government and Finance

BOOKS BY AUTHORITIES

City Planning.—By Charles Mulford Robinson.—Written with special reference to the planning of streets and from the engineer's point of view. 340 pages. Price, \$2.50.

The Planning of the Modern City.—By Nelson P. Lewis.—Devoted almost entirely to the engineering aspects of city planning. The latest American book on the subject. 420 pages. Price, \$3.50.

Municipal Accounting.—By DeWitt C. Eggleston.—It gives the method for handling every kind of financial transaction of a city, illustrated by a complete set of city accounts, worked out with specific figures. 456 pages. Price, \$4.00.

Loose Leaf Digest of Short Ballot Charters.—By Charles A. Beard, Columbia University.—The Final Authority. Kept up-to-the-minute by the loose leaf plan. Contains a digest of state legislation, texts of significant charters, comparisons, numerous expert articles and bibliography. Price, \$5.00 net.

Handbook of Municipal Accounting.—The only work of this character so far available. A simple exposition of a scientific system of accounting and reporting for municipal utilities. Accurate and complete. Price, \$2.00 net.

MUNICIPAL JOURNAL

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What Can You Use?

3,000,000-Gallon Pumping Engines

No. J5403—2 Horizontal Duplex tandem compound condensing high duty pumping engines; capacity, 3,000,000 gallons per 24 hours.

20-Inch Spiral Steel Pipe

No. J5402—20 Miles Abendroth and Root 20" spiral riveted pipe; No. 10 gauge steel. 25' lengths complete with Root bolted couplings.

Valves

No. J5405—10,000 valves—Gate, Globe, Angle and Foot valves made by Crane Company, Kelly Jones and Chapman Valve Companies, sizes 2" to 36".

Cast-Iron Pipe

No. J5404—350 lengths of cast-iron pipe—8", 10", 12", 14", 18", 20" and 24". Bell and spigot ends.

All other equipment included in our complete list No. MJ303. Get your copy now—name your wants today.

ADDRESS

HARRIS BROTHERS CO., Owners
35th and Iron Streets, Chicago

Sale of Unused Equipment

The City of Blue Island offers for sale the following equipment, owned and possessed by it and at present not in use:

- 1—Air Compressor, 14 x 24 x 16, Rand Drill Type No. 10, Duplex Steam, Two Stage Air, 1000 foot capacity, per minute, at 125 lb. pressure.
- 1—Duplex Pump, 16 x 10 x 12, 500 gals. per minute.
- 1—Duplex Pump, 8 x 8 x 6, 125 gals per minute.
- 2—Duplex Pumps, 7½ x 5 x 6, Worthington Boiler Feed.
- 1—Simplex Pump, 5 x 9 x 12, Vacuum Pump.
- 1—Duplex Pump, 6 x 4 x 6, Manistee Pump.
- 4—Kuhlman Transformers, 60 K. W., 60 cycles, 12,000 to 2,200 and 440 volts air cool.
- 1—Switchboard, 40 x 48 x 2, Marble, with switches on same, 3 blade quick break.
- 2—Boilers, 60 x 16, return tubular.
- 1—Open heater, 4' x 14'.
- 2—Square Tanks, 6' x 6' x 6'.
- 60 feet 4 inch pipe with covering on same.
- About 3 tons of scrap pipe, fittings and valves.

Said equipment is now in the power plant of the City of Blue Island at Blue Island, Ill.

Bids for the purchase of said equipment will be received by the City Council of the City of Blue Island until 8 o'clock, July 2nd, 1917, sale being made to the highest bidder.

Mail bids to the undersigned plainly indicating on outside of envelope, that they are for the purchase of old equipment.

The City Council reserves the right to reject any or all bids.

Signed **GEO. J. LANDGRAF, City Clerk.**

OFFICIAL ADVERTISING

"Reaches Most Bidders at the Least Cost"

Rate \$2 an inch. Copy reaching us by 10 a. m.
Thursday will go in issue mailed that night.

CITY MANAGER WANTED

Goldsboro, North Carolina, invites applications for the position of City Manager. Goldsboro is a progressive city of over 11,000 inhabitants, with healthful climate and good trade conditions—located on three railroads in the heart of the most fertile section of eastern North Carolina.

Applicant must have pleasing personality, good business judgment and broad vision. One possessing qualifications of Sanitary Engineer preferred, though this is not absolutely essential.

Excellent opportunity for energetic man of ability to produce results.

Salary will probably range from \$200.00 to \$250.00 per month. Applications will be received up to July 1, 1917. Information and data furnished upon request.

CITY MANAGER COMMITTEE,
P. O. Box 461, Goldsboro, N. C.

Notice to Road Contractors

Notice is hereby given that the Board of Commissioners of Tippecanoe County, State of Indiana, at the County Auditor's office, in the City of Lafayette, Indiana,

on the third day of July, 1917,

up to the hour of ten o'clock A. M., will receive bids for the construction of 2.60 miles of brick road improvement in Fairfield Township, to be known as the M. P. Sheehan et al. road.

Also 2.02 miles of brick road improvement in Wabash Township, to be known as the Henry Klinker et al. road, as ordered by said Board to be constructed; and at the said time will let to the lowest responsible bidder, to contract for the construction according to specifications, plans, profile, estimate, etc., now on file in the office of the County Auditor of said county, at Lafayette, Indiana.

Bidders will be required to file with their bids bonds for double the amount of said bids, conditioned according to law, at least one of which sureties on such bond must be a resident of said county, or a surety company doing business in the county, and affidavits denying collusion as the law provides.

The right to reject any and all bids is reserved.

A reasonable time, to be hereinafter fixed, will be allowed for completing the work.

GEORGE W. BAXTER,
Auditor.
E. S. MINTON,
Engineer.

15,000 Feet

24" Cast-Iron Pipe

Weights 183 lbs. to the foot

**Used but in first-class condition
Immediate Shipment**

ZELNICKER
WALTER A. ZELNICKER SUPPLY COMPANY
St. Louis

HIGHWAY WORK

OFFICE OF THE STATE COMMISSION
OF HIGHWAYS

Albany, N. Y.

Sealed Proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at one o'clock P. M. on Monday, the 9th day of July, 1917, for the repair of highways in the following counties:

ALBANY (two contracts—resurfacing and reconstruction).

BROOME (two contracts—resurfacing).

CATTARAUGUS (one contract—resurfacing).

CHAUTAUQUA (one contract—reconstruction).

COLUMBIA (one contract—reconstruction).

ERIE (one contract—resurfacing).

ESSEX (one contract—resurfacing).

GREENE (one contract—surface treatment).

HERKIMER (one contract—surface treatment).

JEFFERSON (one contract—resurfacing).

LIVINGSTON (two contracts—resurfacing).

MONROE (one contract—resurfacing).

ONEIDA (two contracts—resurfacing and surface treatment).

ONTARIO (one contract—resurfacing).

ORANGE (one contract—reconstruction).

OSWEGO (two contracts—surface treatment).

OTSEGO (one contract—reconstruction).

SARATOGA (one contract—resurfacing).

SENECA (one contract—resurfacing).

STEBEN (one contract—resurfacing).

WASHINGTON (one contract—surface treatment).

Also broken stone contract No. 74, Erie County, on Road 1038, for No. 1 stone, 450 tons; No. 2 stone, 375 tons; No. 3 stone, 3,200 tons.

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the Division Engineers in whose division the roads are to be improved. The addresses of the Division Engineer and the counties in which they are in charge will be furnished on request.

The special attention of bidders is called to "GENERAL INFORMATION FOR BIDDERS" on the itemized proposal, specifications and contract agreement.

EDWIN DUFFEY,

I. J. MORRIS, Commissioner.

Secretary.

(25-26-27)

ELECTRIC TRACTION SHOVEL

Little Giant, 1½-yd. dipper, 3-phase, 60-cycle, 440 volts A. C.

Used only a few days; practically as good as new. A bargain.

ZELNICKER IN ST. LOUIS

FOR SALE

Ten Ton, Three Wheel Roller,
Cheap, McCormick & Son, c/o Municipal Journal.

Compressors

- 1 Ingersoll-Rand, Imperial Type X-B-2, cap. 2,400', belt-driven.
- 1 11x12 Laidlaw-Dunn-Gordon belt-driven machine.
- 1 Sullivan 2-stage, steam-driven, cap. 550'.

Drag-Lines

- 1 No. 2 Monaghan, 65' boom, 2½-yard bucket.
- 1 Page drag-line, 50' boom, 1-yard bucket.

Hoisting Engines

- 2 3-drum 8½x10, with or without boilers.
- 2 7x10 D. C. D. hoists.
- 1 6½x18 D. C. D. hoist with boiler.

Cranes

- 1 15-ton 4-wheel McMyier, 44' boom, 1½-yard clam-shell bucket.
- 1 15-ton 4-wheel Browning, 40' boom, 1½-yard bucket.

Crushers

- 1 No. 3 Austin.
- 1 No. 3 Gates.
- 1 No. 4 Austin.
- 1 No. 5 McCully.
- 1 No. 5 Austin.
- 1 No. 6 Gates Style "K," complete plant.

Cars

- 30 4-yard Western 36" gauge cars.
- 35 1½-yard Western 24" gauge cars.

Steam Shovels

- 1 No. 1 Thew Traction Shovel, 1½-yard, first-class.
- 1 No. 0 Thew Shovel, first-class.

Koppel Track

- 5 Miles 24" track, good as new.
- 1 13-ton Shay gravel locomotive.

Dump Trucks

- 3 White 5-yard dump trucks.
- 2 White 6-yard dump trucks.

Tractors

- 1 Holt Caterpillar, good as new.
- 1 International Mogul, good as new.

George C. Marsh & Co.

791 Old Colony Bldg., Chicago, Illinois

WANTED

Macadam and Tandem Roller—
Must be in good condition. Address Box 795, c/o Municipal Journal.

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40 Miles — 60 Lb. Steel Rails

A. S. C. E. Section, with continuous bars.
Almost New. Western Delivery.
We have large tonnage other sections.

STEEL PILING

Prompt Shipment from Stock.

- 600 pcs. 12-ft. Wemlinger 12"x7½ lbs.
- 345 pcs. 16-ft. Lackawanna 7"x½"
- 363 pcs. 20-ft. United States 12"x¾"
- 585 pcs. 20-ft. United States 12"x¾"
- 125 pcs. 35-ft. Lackawanna 4"x¾"

All first-class driving condition. We have a large stock of all makes, in various lengths. What do you need?

CARS, LOCOS, EQUIPMENT, etc.

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TRANSITS AND LEVELS

Rented by the Day, Week or Month
Used instruments bought, sold and exchanged for new.

THE ENGINEERING AGENCY, Inc.
53 W. Jackson Blvd. Chicago

PROPOSALS

Wanted

A STREET FOREMAN by an old-established firm for the laying of sheet asphalt and bituminous mixtures. Must have at least five years' experience; not over forty-five years old. Season work with yearly contract to the right party. Salary not a question; must deliver the goods. Also an ASPHALT PLANT FOREMAN under similar conditions. State salary. Send application and references to B. C. A. Dept., c/o Municipal Journal, 243 W. 39th St., New York, N. Y.

Minneapolis, Minn.—See "Sewerage."

Binghamton, N. Y.—City engineering department preparing plans for new concrete bridge to span Park Creek at Vestal Ave.

Bethlehem, Pa.—County Comm. at Easton decided to repair the north approach to the old Lehigh River Bridge here with amiesite.

South Bend, Wash.—See "Streets and Roads."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Decatur, Ill.—Contracts for the construction of the new steel bridge across Stevens Creek where it intersects the Springfield road were awarded by the joint committee of highway commissioners and supervisors. For the construction and erection of the superstructure was awarded to the *Decatur Bridge Co. at \$1,700; for the concrete abutments, *Jerry Driscoll on his bid of \$10,375; for the earth work went to *S. A. Tuttle, his bid being 38 cts. per cu. yd. on an estimated volume of 25,000 yds. The bridge roadway is to be 20 ft. in width and will be of creosoted wooden blocks upon reinforced concrete slabs. According to the bids the structure will cost \$37,500.

Schenectady, N. Y.—See "Sewerage."

Columbus, O.—See "Streets & Roads."

Providence, R. I.—The State Board of Public Roads awarded a contract for building a new bridge at Wickford, to the *W. G. Balchin Engineering & Construction Co. for \$4,487.

MISCELLANEOUS.

Windsor Locks, Conn.—Plans have been completed for the erection of a new combination town hall and fire station. Estimated cost, \$70,000.

Miami, Fla.—See "Sewerage."

Freeport, Ill.—Board of Supervisors passed resolution for the purchase of two tractors for the county. Bids will be asked for.

Freeport, Ill.—Supervisor E. V. Peck of Florence Twp. presented a petition to the board of supervisors of Stephenson County recommending the purchase of two road tractors by its county, to be used in the township.

Newport, Ky.—An election will be held shortly to vote on issuing \$40,000 garbage incinerator bonds.

Albert Lea, Minn.—No action was taken by City Council on supplying the city with new street signs, which was introduced by a representative from a sign company.

Albert Lea, Minn.—City purchased an Edwards Road Grader for the city streets.

Albert Lea, Minn.—City Council petitioned for oiling of several streets.

Duluth, Minn.—Council received petitions for oiling of the boulevard from 5th to 7th Ave. West.

Minneapolis, Minn.—See "Sewerage."

Moorhead, Minn.—Minneapolis Trust Co. purchased the \$125,000 drainage bonds authorized by the Clay County Commissioners for covering the cost of construction of a number of county ditches.



Twenty Million Miles of Telephone Wire

The telephone wire in use in the Bell System is long enough to run from the earth to the moon and back again forty times.

The Bell System has about twice as much telephone wire as all Europe.

More than 500,000 new telephones are being added to the Bell System yearly—almost as many as the total number of telephones in England.

In twelve months the Bell System adds enough telephones

to duplicate the entire telephone systems of France, Italy and Switzerland combined.

In proportion to population the extension of the Bell System in the United States is equal in two years to the total telephone progress of Europe since the telephone was invented—a period of about forty years.

The Bell System fills the telephone needs of the American people with a thoroughness and a spirit of public service which are without parallel the world over.



AMERICAN TELEPHONE AND TELEGRAPH COMPANY
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One Policy

One System

Universal Service

Osmond, Neb.—City has had plans prepared for a new city hall and fire station to cost about \$12,000.

Cambridge, O.—Messrs. Sidney Spitzer & Co. of Toledo, purchased the \$51,000 county bonds. T. C. White County Aud.

Eric, Pa.—Council passed finally Street Director W. D. Kinney's bill providing for the construction of the Parade St. subway retaining walls and appropriating \$13,260.

Hogusam, Wash.—City's \$170,000 Funding Bonds have been sold to the State of Washington. Esther E. Lundin, City Clk.

Glencoe, Ont.—Town Council plans water storage tanks for fire purposes. Clerk, Charles George.

Portland, Ore.—Taxpayers voted in favor of issuing \$3,000,000 municipal grain elevator bonds.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Chicago, Ill.—Bd. of Local Improvements, Michael J. Flaherty, Pres., Edward J. Glackin, Secy., June 13 awarded drains in several streets and avenues, as follows: *Nascenzo Di Domenico, *Angelo Mancini, *Mike Di Vito, *John Rufo and Henry Till, *Sironi & Gentile, *Tiritelli & Tiel.

Eliminate Slippery Pavements



BABY SAND SPREADER

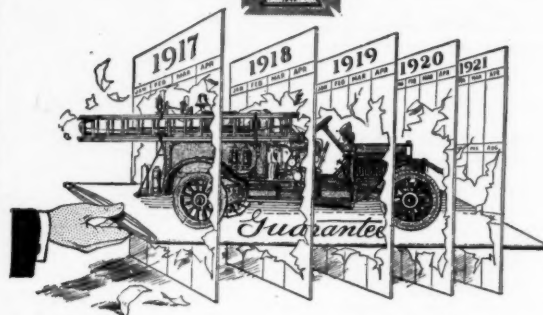
ONE MAN AND A BABY SAND SPREADER will spread sand as rapidly as the man can walk. The device will spread moist sand on walks or pavements.

Buy a Baby Sand Spreader and avoid accidents and consequent damage suits. Accident suits are costly.

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Finding the seat of the fire and confining it, is best effected by efficient fire forces having a sufficient supply of reliable and substantial hose such as manufactured by

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No apparatus has ever been shown for Municipal Telegraph Systems that was not either an Imitation of Gamewell Standards or patterned after methods discarded by our engineers.

While "Imitation is the sincerest of flattery" yet when used to protect life and property it is dangerous.

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Nippon Electric Company, Ltd., Tokio, Japan
N. C. Heisler Electro Mechanical & Telephone Works Company, Petrograd, Russia
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